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THE

PROCEEDINGS

OF THE

LINNEAN SOCIETY

OF

NEW SOUTH WALES.

VOL. X.

[WITH FIFTY-SIX PLATES.]

FOR THE YEAR 1885.

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Page 130, line 2 from top—*for* Cacostoma *read* Cacostomus.
Page 130, line 2 from bottom—*for* Lamprina *read* Lamprima.
Page 130, line 3 from bottom—*for* Latreilla *read* Latreille.
Page 130, line 4 from bottom—*for* Harrolds *read* Harold's.
Page 130, line 8 from bottom—*for* Lueanus *read* Lucanus.
Page 131, line 4 from bottom—*for* scuriform *read* securiform.
Page 132, line 5 from top—*for* Harrolds *read* Harold's.
Page 133, line 1 from top—*for* Harrold *read* Harold.
Page 133, line 18 from top—*for* sulfalciformi *read* subfalciformi.
Page 133, line 19 from top—*for* lacvi *read* lævi.
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Page 133, line 1 from bottom—*for* mandables *read* mandibles.
Page 134, line 9 from bottom—*for* Kreftii *read* Krefftii.
Page 135, line 7 from top—*for* Harrold's *read* Harold's.
Page 135, line 8 from top—*for* Lotreillei *read* Latreillei.
Page 136, line 3 from top—*for* mentam *read* mentum.
Page 138, line 8 from bottom—*for* Lamprina *read* Lamprima.
Page 139, line 11 from top—*for* Annales Musco civico *read* Annali del Museo civico.
Page 139, line 16 from top—*for* Ncolamprina *read* Neolamprima.
Page 139, line 19 from top—*for* Neolamprina *read* Neolamprima.
Page 149, line 5 from bottom—*for* Beccari *read* Beccarii.
Page 167, line 14 from top—*for* orientatis *read* orientalis.
Page 168, line 1 from top, omit hyphen.
Page 175, line 12—*after* word section *insert* Vide Plate 22.
Page 178, line 2—*after* Vol. VIII. *read* page 92.
Page 180, In notes to Table B., Note 1, *omit* Royal Soc., N. S. W., p. 82.
Page 180, In note 3—*read* page 53.
Page 180, In note 4—*read* Lin. Soc , New South Wales, page 52.
Page 199, top line—*for* Lucandiæ *read* Lncanidæ.
Page 215, last line -*for* miles *read* feet.
Page 232, line 9—*for* Schlegeli *read* Schlegelii.
Page 234, line 24, from top—*for* or Bell River *read* River.
Page 236, line 3--*for* Diagram II. *read* I.
Page 236, line 24—*for* 100 to 150 *read* 10,000 to 15,000.
Page 235, line 15—*for* at the *a* level *read* at a, the level.
Page 256, line 10 from bottom—*for* Pelccanus *read* Pelecanus.
Page 320, line 14 from top—*for* noum *read* novum.
Page 331, line 2 from bottom—*for* branched *read* branchial.
Page 342, line 4 from top - *for* Australis *read* bibronii.
Page 457, line 2 from top—*for* Beatham *read* Bentham.
Page 503, line 6 from bottom—*for* siena *read* sienna.
Page 527, line 10 from top—*for* Euspongai *read* Euspongia.
Page 534, line 7 from top—*for* ipse facta *read* ipso facto.
Page 560, line 13 from top—*for* tranverse *read* transverse.
Pages 563 and 573 omit all references to fig. 6, which had to be left out when it was too late to alter the text.
Page 570, line 7 from bottom—*for* Dactylochalioa *read* Dactylochalina.
Page 571, line 11 from bottom—*for* where *read* were.
Page 573, line 15 from bottom is to be omitted altogether.
Page 578, line 8 from bottom—*for* has *read* was.

PROCEEDINGS

OF THE

LINNEAN SOCIETY

OF NEW SOUTH WALES.

WEDNESDAY, 28TH JANUARY, 1885.

The President, Professor W. J. Stephens, M.A., F.G.S., in the chair.

Mr. T. W. David, B.A., F.G.S., of the Mines Department, was introduced as a visitor.

MEMBERS ELECTED.

Mr. E. G. W. Palmer, Burwood; Mr. Arthur J. Mills, Burwood; Mr. Alexander Hamilton, Guntawang, N.S.W.; Mr. Smithurst.

DONATIONS.

"Feuille des Jeunes Naturalistes." No. 169. November 1884. From the Editor.

"Bulletin de la Société Royale de Géographie d'Anvers." Tome IX., Fasc., 2, 1884. From the Society.

"Victorian Naturalist." Vol. I., Nos. 11 and 12, November and December, 1884. From the Field Naturalists' Club of Victoria.

"Zoologischer Anzeiger." Jahrg. VII., Nos. 182, 183, 1st and 15th December, 1884. From the Editor.

"Midland Medical Miscellany." Vol. III., No. 36, December, 1884. From the Editor.

"Verhandlungen des Naturhistorischen Vereines des preussischen Rheinlandes und Westfalens." Jahrg. IX., Heft. 2, Jahrg. X., Heft 1 and 2. 1882-83, 8vo. From the Society.

"Science." Vol. IV., Nos. 94 to 97. November 21st to December 10th, 1884. From the Editor.

"Annual Report of the Curator of the Museum of Comp. Zool. of Harvard College, Cambridge, Mass., for 1883-84." From Prof. Alex. Agassiz.

"Eucalyptographia." By Baron F. von Müller. Decade X., 1884. From the Author.

"Journal of Conchology. Vol. IV., No. 8. October, 1884. From the Conchological Society of Great Britain.

"Bolletino della Societa Africana d'Italia." Anno III., Fasc. 3, 4, and 5. June, August and October, 1884, 8vo. From the Society.

PAPERS READ.

A MONOGRAPH OF THE AUSTRALIAN SPONGES

By R. von Lendenfeld, Ph.D.

Part IV.

Plate I. to V.

PRELIMINARY REPORT ON THE AUSTRALIAN MYXOSPONGIÆ.

II. ORDO. MYXOSPONGIÆ. Haeckel (1).

SPONGES WITHOUT A SKELETON, OR WITH SPHERICAL POLYACTINELLID FLESHSPICULES.

Sollas (2) has remarked in a recent paper that the Myxospongiæ, as a group, containing Halisarca and Chandrosia, will eventually have to be abandoned, he thinks that the difference between the Halisarcinæ and Gumminæ is so great that we cannot combine them. The Halisarcidæ, with the genera *Halisarca* Dujardin and *Oscarella* Vosmær, are, according to Sallas, the sole true representatives of the Myxospongiæ, whilst the Gumminæ should, according to him, be placed in the neighbourhood of the Tetractinellidæ.

It is very difficult to say whether the Gumminæ represent transition forms from any ancestral groups to the Tetractinellidæ or not, but it is quite certain that there is a vast difference between the Gumminæ on the one hand and *Oscarella* and *Halisarca* on the other.

I think it will approach the real relationship nearest, to establish for these groups two Sub-orders within the Ordo Myxospongiæ, as follows :—

---

(1) *E Haeckel.* Die Kalkschwämme, eine Monografie. Band I., Seite 453.

(2) *W. T. Sollas.* On the development of Halisarca lobularis, O.S. Quarterly Journal of Microscopical Science, Vol. XXIV., p. 618.

I. SUB-ORDO. MYXINÆ. Von Lendenfeld.

MYXOSPONGIÆ, THE GROUND SUBSTANCE OF THE MESODERM OF WHICH IS A SOFT AND TRANSPARENT GALLERT AND DESTITUTE OF FIBRILLS OR SPICULES. RARELY SUPPORTED BY DISTANT FIBRES (HALISARCA). THE CILIATED CHAMBERS IN A SURFACE LAYER. THE INTERIOR LACUNOSE AND WITHOUT CHAMBERS.

This Sub-ordo is identical with the Halisarcinæ of O. Schmidt (1).

8. FAMILIA. OSCARELLIDÆ. Von Lendnfeld.

Myxinæ, with spherical ciliated chambers.

No Australian representatives of this family are known.

The sole representative, at the same time the type-species of the family is Halisarca lobularis, O. Schmidt (2), Oscarella lobularis, Vosmaer (3). It has been very exhaustively described by F. E. Schulze (4) and others. Halisarca Dujardini, Johnstone likewise exhaustively described by F. E. Schulze (5) belongs, I think, to another, the following family. The right place can of course not be assigned to those species which have not been investigated in a scientific manner.

9. FAMILIA. HALISARCIDÆ. Von Lendenfeld.

Myxinæ with sack-shaped, elongated ciliated chambers.

The type species of this Family is Halisarca Dujardini Johnstone, which has ramified ciliated tubes like certain Sylleibidæ. An Australian species which I have discovered belongs to this Family as possessing *elongate* ciliated chambers, the fibres found in Halisarca Dujardini are absent and the ciliated chambers are very regular in shape and never appear ramified. I establish therefore for this species the following new Genus.

---

(1) *O. Schmidt.* Die Spongien des Adriatischen Meeres. Seite 79.

(2) *O. Schmidt.* L.c. Seite 80.

(3) *G. Vosmaer.* Porifera, Classen und Ordnungen des Thierreiches. Von Bronn. Band II., Tafel VIII.

(4) *F. E. Schulze.* Die Gattung Halisarca, Zeitschrift für Wissenschaftliche Zoologie. Band XXVIII., Seite 1.

(5) *F. E. Schulze.* L.c.

23. GENUS. BAJALUS. Von Lendenfeld (1).

Halisarcidæ with regular cylindrical not ramified, elongate ciliated chambers.

53. SPECIES BAJALUS LAXUS. Nov. spec.

This is the only Australian representative of the Suborder Myxinæ.

The specific name is derived from the loose texture and tenderness of the whole sponge, a consequence of its extensive lacunose cavities.

Our sponge represents (fig. 1-2) an irregular ramified or lobular mass of a dull purple colour. The separate processes are either finger-shaped and slender as in the specimen represented in fig. 1, or short broad and lobular as in the other. They measure to 18 mm. in length and from 2-10 mm., in breadth. The long and slender processes are cylindrical, the truncate ones generally more or less flattened. Both kinds of processes never occur on the same specimen, so that one might distinguish two varieties of this species, one with broad the other with slender ramifications. The whole sponge never seems to attain a large size, the finest specimen I have seen measured 50 x 40 x 20 mm. They seem always more or less expanded in one plain.

The Oscula are situated terminally on the processes so that there are as many vents to the sponge as there are branches to it. There are very small "chimneys" on them, slightly smaller than those tubes described by Schulze (2), which appear as prolongations of the Oscula margin in Oscarella lobularis.

The surface of the sponge appears perfectly smooth as in Halisarca Dujardini. The Oscula measure from 1-2 mm. across and are liable to great alterations in size. The "chimney" can be retracted, so as to leave the oscular opening nearly bare.

The inhalent pores measure 0·1 mm. across; they are circular. Each is covered by a thin and tender perforated plate. The perforations are circular or polygonal with rounded corners and measure 0·01 in diameter (fig. 4). These little pores, as also the large inhalent vents below them, are liable to great alterations in size and can be contracted, the little ones even closed by the Sponge.

---

(1) *Bajulus.* A man who carries sacks, sackbearer.
(2) *F. E. Schulze.* L c. Plate I., fig. 6.

CANAL SYSTEM.

The Canal System is very peculiar and totally different from that of Oscarella. It approaches that of Halisarca but appears also much more complicated and highly developed than it is in that Sponge.

The outer skin (*b.* fig. 4) is divided from the interior part of the sponge, from the zone of ciliated chambers by a broad subdermal cavity, 0·15 mm., wide. This cavity is continuous. It is traversed in all directions by a highly complicated network of fine threads measuring 0·005—0·01 mm., in thickness (*s.* fig. 4). These repeatedly ramified anastomosing threads are cylindrical and between the joining points generally more or less straight. These threads connect the skin and the body of the Sponge. They appear to be contractile to a certain extent and by their contraction the subdermal cavity can be diminished in size locally.

The zone of ciliated chambers is much folded, and does not reach the subdermal cavity everywhere; there are moreover, empty spaces left between, which appear as inhalent canals (*i.*, fig. 3, *j.*, fig. 4). These are of an irregular shape, somewhat conic, as they are invariably wider centrifugally than proximally.

The ciliated chambers are of a regular elongate, oval, cylindrical shape. They are longer than in Aplysilla (1), and represent somewhat the radial tubes of the Syconidæ or the ciliated chambers of Euplectella (2). They measure 0·17 in length and are 1·03 mm. wide (*f.*, fig. 4). They have inhalent pores only at the distal end which touches a part of the inhalent canal system. These pores are variable in number, probably because the Sponge can close them at option. Generally there seem to be from 3—5. As a look at fig. 4

---

(1) *R. v. Lendenfeld.* Neue Aplysinidæ, Zeitschrift für wissenschaftliche Zoologie. Band XXXVIII., Seite 234.

(2) *F. E. Schulze.* The soft parts of Euplectella aspergillum. Transactions of the Royal Society of Edinburgh. Vol. XXIX., p. 661. Tab. A.

will show, some chambers are in direct communication with the subdermal cavity, whilst others draw their supply of water from the inhalent canals. These ciliated chambers are not constricted at their exhalent aperture, which is circular and opens generally into a narrow exhalent canal (e. fig. 3), a few ciliated chambers open direct into the gastral cavity in the centre of the Sponge.

The exhalent canal system consists of more or less radial narrow canals, pointing slightly upwards towards the Osculum, these canals are cylindrical and curved in such a manner, that their distal portion runs for a short distance parallel to the outer surface, whilst their proximal part is radial, and often stands at nearly right angle with the former; and of an extensive gastral cavity taking up the central portion of the Sponge and traversed by a few thick and ramified threads of tissue.

The narrow exhalent branch canals have a diameter measuring from 0·1—0·3 mm. The central gastral cavity has a diameter equal to a fourth to a third of the diameter of the part of the Sponge in which it is situated. The threads pervading it in varying direction are distant and rare. They are more or less cylindrical, and measure 0·1 mm. in thickness.

Towards the Osculum they get scarcer and scarcer, in the uppermost 5 mm. of the Oscular tube or Gastral cavity there are none. (Fig. 3.)

HISTOLOGY.

The *Skin* is covered on both sides by a low flat Epithelium and contains in the Gallert of its Mesoderm three kinds of cells. Amœboid wandering cells towards the lower surface in great abundance forming a regular layer (*d.* fig. 4); ordinary multipolar tissue cells and an external layer of Gland cells.

In the *threads* perforating the subdermal cavity, which are covered by the same Epithelium as the outer skin we find bipolar and multipolar tissue cells and also a few amœboid wandering cells The extensive inhalent canals are clothed with a similar Epithelium. The fringe cells in the chambers are of uniform kind throughout and do not become lower towards the inhalent aperture as in some other Sponges. The Mesoderm between them is filled with bipolar and multipolar tissue cells and also contains a few wandering amœboids (fig. 4).

The thick threads pervading the gastral cavity are covered by a flat Epithelium, which is not different from the ectodermal Epithelium of the outer surface and inhalent canal system. The most prominent elements in this part of the Sponge are the sexual products, which at certain seasons take up nearly the entire substance of these gastral threads.

THE AMŒBOID WANDERING CELLS.

Partly by observations on the distribution of these elements and partly by a series of experiments, I have been led (1) to assume that they absorbed digestible matter, which is transmitted to them by the Epithel cells on the upper side of the Subdermal cavities in certain Aplysinidæ.

The distribution of these elements in our Sponge also points to a similar function. They are most numerous just below the inner surface of the skin, and met with, less abundantly, also in other parts of the Sponge.

I had no opportunity of observing these cells in the live tissue, but the images represented by good sublimate and Alcohol specimens on sections are exactly like those described by me (l.c.) in the case of Aplysinidæ.

THE GLAND CELLS.

These elements have the same position as the corresponding elements in Aplysinidæ (2), and are also of similar shape. They appear pear-shaped and attached to the outer surface by two to four slender threads. They measure 0·01 x 0·002 mm.

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(1) *R. v. Lendenfeld.* Neue Aplysinidæ. Zeitschrift für wissenschaftliche Zoologie. Band XXXVIII., Seite 249, ff.

(2) *R. v. Lendenfeld.* L.c. Seite 254.

THE SEXUAL PRODUCTS.

Ova and Spermatophores, that is to say, masses of Spermatozoons enclosed in a kind of sack are found abundantly and exclusively in the threads of the Gastral cavity. Poléjaeff (1) has given a new explanation of the formation of these masses of Spermatozoons, and I am inclined to believe that the Spermatogenesis described by that author from Sycandra also holds good in the case of our Bajalus.

Ova and Spermatozoa are never found in one and the same specimen, but that is no reason why this Sponge should not be hermaphroditic all the same, as it is not altogether improbable that the male and female products are matured in the same specimens at different times.

The fact that the sexual products are massed in the interior of the Sponge, in the exhalent canal system, shows that our Sponge is in this particular similar to Aplysilla (2), and particularly to Oscarella lobularis (3).

We find that in our Sponge there is, if my hypothesis (4) regarding the digestion of Sponges be accepted, a digestive cavity below the skin—the subdermal cavity—a breathing and excretary zone below this—the ciliated chambers—and a kind of very little differentiated sexual organ in the centre—the gastral threads—whilst the "Gastral cavity" has the function of a breeding place, a marsupium.

Locality: South Coast of Australia, Port Phillip, Von Lendenfeld. Pretty rare in the laminarian zone attached to stones.

Season: The Sponge was found repeatedly with sexual products in August and September. At that time and also at other times specimens without sexual products were obtained.

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(1) *N. Poléjaeff.* Die Spermatogenese bei Sycandra raphanus. Sitzungsberichte der Kaiserlichen Academie der Wisenschaften in Wien, Mathematisch-Naturwissenschaftliche Classe. Band LXXXVI., Seite 278.

(2) *R. v. Lendenfeld.* L.c. Tafel XI., fig. 14.

(3) *F. E. Schulze.* Die Gattung Halisarca, Zeitschrift für wissenschaftliche Zoologie. Tafel IV., fig. 20.

(4) *R. v. Lendenfeld.* The Digestion of Sponges Ectodermal or Entodermal. Proceedings of the Linnean Society of New South Wales. Vol. IX., p. 434, ff.

II. SUBORDO. GUMMINÆ.

O. Schmidt (1).

MYXOSPONGIÆ WITH A MESODERM RENDERED TOUGH BY NUMEROUS DENSELY PACKED FIBRILLS WHICH FORM THE MAIN PORTION OF THE WHOLE SPONGE AND WHICH GIVE TO IT THE KNOWN INDIA-RUBBER LIKE DEGREE OF ELASTICITY AND HARDNESS. WITH OR WITHOUT SPHERICAL POLYACTINELLID FLESH-SPICULES.

This Subordo comprises at present only the single Family of the Chondrosidæ

When the aberrant *Cellulophana* O. Schmidt, will be better known it may perhaps require the establishment of a family for itself.

Corticium, O. Schmidt, which as we shall see connects the Gumminæ with the Tetractinellidæ might perhaps also be placed in a separate family of the Gumminæ.

10. FAMILIA. CHONDROSIDÆ. F. E. Schulze (2).

With the characters of the Subordo.

F. E. Schulze (3) has taken the trouble to enumerate all Sponges which have been described as members of this group.

There are seven genera enumerated by him :—Chondrosia, Nardo (4) ; Chondrilla, O. Schmidt (5) ; Osculina, O. Schmidt (6) ; Columnites, O. Schmidt (7) ; Corticium, O. Schmidt (8) ; Cellulophana, O. Schmidt (9), and Lacinia, Selenka (10).

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(1) O. *Schmidt*. Die Spongien des Adriatischen Meeres. Seite 37.

(2) *F. E. Schulze*. L.c. Seite 87 ff.

(3) *F. E. Schulze*. Die Familie der Chondrosidæ. Zeitschrift für wissenschaftliche Zoologie. Band XXIX., Seite 95.

(4) *Nardo*. Osservazione anatomiche supra l' animale marino detto volgarnente Rognone di mare Estratte dal, Vol. VI., degl' Atti dell' Istituto Veneto.

(5) *O. Schmidt*. Die Spongien des Adriatischen Meeres. Seite 38.

(6) *O. Schmidt*. Die Spongien der Küste von Algier (Drittes Supplement zu den Spongien des Adriatischen Meeres.) Seite 42.

(7) *O. Schmidt*. Grundzüge einer Spongienfauna des Atlantischen Gebietes. Seite 25.

(8) *O. Schmidt*. Die Spongien des Adriatischen Meeres. Seite 42.

(9) *O. Schmidt*. Die Spongien des Adriatischen Meeres. Seite 41.

(10) *E. Selenka*. Ueber einige Schwämme aus der Südsee, Zeitschrift fü Wissenschaftliche Zoologie. Band XVII., Seite 568.

Chondrosia, Osculina, and Cellulophana contain no fleshspicules, and I combine them in my Sub-family Chondrosinæ.

Chondrilla contains spherical polyactinellid spicules, and I place it in my Sub-family Chodrissinæ.

Corticium, I consider, as a genus of Tetractinellidæ, connecting this order with the Myxospongiæ, in accordance with O. Schmidt (1).

Colummites is a Monactinellid Sponge, and Lacinia as Carter (2), and F. E. Schulze (3) have shown is no Sponge at all.

The Australian specimens I have found can be placed in the existing genera without any difficulty.

I. SUB-FAMILIA CHONDROSINÆ. Von Lendenfeld.

Chondrosidæ without fleshspicules.

24. GENUS. CHONDROSIA. Nardo.

Chondrosinæ with one or a few Oscula, a smooth surface and without incised frills to the Oscula.

54. SPECIES. CHONDROSIA RAMSAYI. Von Lendenfeld, fig. 6—9.

I dedicate this species to the Curator of the Australian Museum.

Chondrosia Ramsayi appears in flat, irregular masses, attached to rocks etc., by a few small places only. It always seems to have the shape of a convex lamella. The convex side is uppermost. Such a lamella may attain an extension of 40 x 30 mm., and at the same time be about 10—14 mm. thick. Smaller specimens are proportionately thinner.

The color is, extraordinary to say, subjected to no variability, it is always dark blueish black all over the Sponge in reflected light.

In transmitted light it is dark brown.

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(1) *O. Schmidt.* Grundzüge einer Spongienfauna des Atlantischen Gebietes. Seite 64.

(2) *T. Carter.* On two new species of Gumminæ. Annales and Magazine of Natural History. Ser. IV., Vol. VII., p. 26.

(3) *F. E. Schulze.* Die Familie der Chondrosidæ. Zeitschrift für Wissenschaftliche Zoologie. Band XXIX., Seite 92.

The surface is shining as in other species, but *not quite smooth.* A reticulate structure as described by O. Schmidt (1) of Chondrosia plebeja does not exactly make its appearance, but still the roughness is of a kind not met with in other species of Chondrosia, so that by this alone our species is distinguished from others.

A transverse section shows, that the cortex is highly developed, and has a dark outer margin, it is very light coloured towards the interior. The Pulpa is of a uniform dark brown color. A few canals are seen in it (fig. 6), but these are rare and small, so that the Sponge is pretty dense, as is the rule with the genus.

The Osculae are more numerous than in other species, and grouped together asin Osculina (2). They possess small "chimneys" that is thin membraneous frills about 1 mm. high, which however are simple cylindrical, and have a smooth margin (different from Osculina.)

THE CANAL SYSTEM.

The Canal System certainly shows some peculiarities which distinguish it from the hitherto investigated species, and if I have not established a new genus for our Sponge I have not done so mainly for the sake of simplicity and also because the canal system of our species although peculiar can be easily derived from that, so excellently described, of Chondrosina reniformis by F. E. Schulze (3).

Scattered all over the surface we find small pores, measuring about 0·01 across. These are circular and we soon perceive that they are always situated in groups of 5—10 and in fact, that there always lies a group of such pores at the base of an indenture. These indentures of the surface are inconspicuous. Their existence causes the roughness of the surface described above (fig. 8). I think it highly probable, that the pores of Chondrosia plebeja may be distributed in a similar manner.

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(1) *O. Schmidt.* Die Spongien der Küste von Algier. Seite 1.
(2) *O. Schmidt* L.c. Seite 2.
(3) *F. E. Schulze.* Die Familie der Chondrosidæ. Zeitschrift für wissenschaftliche Zoologie. Band XXIX. Seite 100 ff.

Below each group of pores we find an extensive hollow (on the section). In comparing the different sections of a continuous series it is easy to ascertain that these hollows are the expression of transverse sections of tangentally extended wide lacunose canals (fig. 7-8). Below the zone of these smaller tangental lacunes we find a system of larger ones similar in shape and distribution. The canals of the outer zone communicate with one another by means of very rare and minute pores (fig. 8), and also with the larger lacunes below by means of similar pores which in consequence of their paucity and smallness are very hard to find (figs. 7-8).

All these lacunes lie so close to one another, that only narrow walls of tissue remain between them (fig. 7.)

The average diameter of the lacunes in the outer zone is 0·05, of those in the lower zone 0·2mm. The lucunose zone has a thickness of 0·4 mm.

Below this no lacunes are found in the cortex, except a few very distant and large irregular tangental canals (fig. 6), which collect the water from the small communicating outer lacunes. These canals have very irregular transverse sections and an average diameter of 1 mm. The cortex is of about equal thickness, so that the whole thickness of it is taken up by these large inhalent canals. The lower side of these large tangental canals lies in the surface, which divides the cortex from the Pulpa of the Sponge.

From this lower side numerous canals originate, which are cylindrical, and follow a more or less radial direction. Repeatedly ramified, they become smaller and smaller the further we penetrate into the Sponge.

Around the final coecal and narrow ramifications the ciliated chambers, which are spherical, cluster. They have a diameter of 0·05 mm., and do not appear to be very numerous. The inhalent pores could not be found. The exhalent opening is small and circular. Regarding their shape and position they do not differ from those of Chondrosia reniformis, and I refer to F. E. Schulze's (1) description.

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(1) *F. E. Schulze.* Die Familie der Chondrosidæ. Zeitschrift für wissenschaftliche Zoologie. Band XXIX. Seite 107-108.

The exhalent canal system is simple not lacunose, and shows no peculiarities.

STRUCTURE.

Histologically our species resembles Chandrosia reniformis (1) very closely. The round fat like globular masses are most numerous towards the outer surface. Here also the Pigment masses (fig. 8) are situated. The latter follow the inhalent canals downward for a good distance (fig. 8). I found the whole surface covered with flat Epithelial cells. I failed to detect Gland cells, and believe that their protective function is performed in the Gumminæ by the universally distributed fat-like spherules so common below the outer surface. The walls of the large Canals inhalent and exhalent are highly granular, and the margin of this granular coating is sharply defined outward towards the Gallert tissue of the Sponge. This granular lamella is thicker around the large canals than around the small ones. Ciliated chambers are never found in the granular canal coating.

The pigment is massed in the outer portion of the Cortex, which consequently appears very dark in colour. The rest of the Cortex is nearly colourless, hyaline, and of much lighter colour than the pulpa (compare also F. E. Schulze's figures (2), the latter is very granular and intransparent.

Locality: East Coast of Australia, Port Jackson, 10-20 metres on stones, &c. (Ramsay.)

II. SUB-FAMILIA. CHONDRISSINÆ. Von Lendenfeld.

Chandrosidæ, with fleshspicules. The fleshspicules of this subfamily are of a very simple kind, and all represent the type of a ball with numerous irregularly disposed axes. The axes are represented by spines, extending radially from the sphere. The possible variations are the following: The spines may attain a relative great length whilst the diameter of the central solid sphere decreases;

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(1) *F. E. Schulze.* Die Familie der Chondrosidæ. Zeitschrift für wissenschaftliche Zoologie. Band XXIX. Seite 100 ff.

(2) *F. E. Schulze.* L.c. Tafel VIII., fig. 8.

in this way the star shaped spicule is produced. The spines of this may be smooth or roughened, and serrated by secundary very small spines extending centrifugally.

If the central solid sphere attains a large size and the spines become small then the shape of a spiny ball is attained, which may be more like a Datura fruit or a Swiss "Morgenstern," according to whether the spines are numerous and slender or not numerous, short and thick.

25. GENUS. CHONDRILLA. O. Schmidt (1).

Chondrissinæ without subdermal cavities. The commencement of the inhalent canal system consists of a great number of parallel radial canals leading from the inhalent pores direct into tangental canals which collect the water and from which the inhalent system of the Pulpa originates.

Although this Genus is at present the only one of the Sub-family, still I give this diagnosis for the purpose of showing on what principles I consider other genera might be established.

55. SPECIES. CHONDRILLA SECUNDA. Nov. spec. Fig. 10-12.

I name this Sponge the second to commemorate the fact that it was of the thousands of different forms collected by me in Australia the second specimen I found.

Our Sponge resembles in outer appearance a lamellar or irregular bulbous mass, the lamellar shape is by far the most frequent. The Lamellæ are not of uniform thickness throughout; they attain an average size of 30 x 60 mm. and more, and are in the thickest part 12 mm., in diameter. In places these lamellæ are very thin and in fact they may be pierced in certain places so as to present a sieve-like appearance. The bulbous variety of this species is not large; it attains a diameter of 25-35 mm. It is attached to stones etc., by a small basis only. Also the more frequent lamellar form is attached to stones by small parts of its lower surface only. I obtained most of my specimens adrift The surface is perfectly smooth. The colour is subject to similar variations as in some European species and varies from light dull yellowish gray to dark bluish black.

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(1) *O. Schmidt.* Die Spongien des Adriatischen Meeres. Seite 38.

Mostly the side exposed to the light seems to be of a darker colour than the other. However a strict rule can be established here as little as in the case of Chondrosia reniformis (1).

The outer surface-colour only is subject to the above variations. The interior of the Sponge always has the same dull grey colour. A Cortex is not distinguishable.

The oscula are raised slightly over the surrounding surface 3—6 in number, always on the upper side of the flat specimens, circular and about 2—3 mm. in diameter.

The bulbous specimens have only one osculum.

The outer part of the Sponge appears very dark and intransparent, in consequence of the great number of pigment granules in the dark parts. The light parts are much better suited for investigation and more transparent. This outermost zone always appears radially striped in consequence of the inhalent canals all standing vertical on the surface in their outer portion.

STRUCTURE.

Our species does not seem to differ from Chondrilla nucula (2) in any respect, except the shape of the spicules. There are two kinds of spicules. (Figs. 11, 12.)

Both kinds are met with not very abundantly throughout the Sponge. Towards the outer surface, and particularly also in the canal walls, they became much more numerous.

The larger kind measure 0·064 mm., the smaller kind 0·012 mm. across. The spines of the larger kind are about 0·006 mm. long at 0·004 mm. broad. The spines of the smaller kind measure 0·003 x 0·001 mm.

The larger kind represents a ball with distant short and truncate smooth spines which are rounded terminally. The surface of the central sphere is clearly visible between the spines. In the small kind the spines are pointed and relatively much longer, three times as long as broad at the base, regularly conic. The surface of the central sphere does not exist, the spines stand so close that their bases touch each other.

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(1) *F. E. Schulze.* Die Spongien des Adriatischen Meeres. Seite 97-98.

(2) *F. E. Schulze.* Die Familie der Chondrosidæ. Zeitschrift für wissenschaftliche Zoologie. Band XXIX., Seite 108 ff.

Locality : South Coast of Australia, Port Phillip. (Von Lendenfeld.) Laminarian Zone.

56. SPECIES. CHONDRILLA AUSTRALIENSIS. Carter (1).

Incrusting or self-supporting, and spreading horizontally, flat, cakeshaped, lobed, of a dirty yellow or buff colour. Surface smooth, slippery, glistening consistence, semi-elastic, subcartilaginous. Tolerably tough. Vents numerous, small, of different sizes in groups or terminal on the lobes. Cortex translucent.

Spicules of two kinds. 1. With short, sharp conic spines, taking up the whole surface of the sphere. 2. With slender, sometimes terminally bifid or trified spines, with serrate side These two kinds of spicules are most numerous towards the outer surface. The short spined spicules measure 0·026 mm., the others 0·026 mm. across.

Locality : East Coast of Australia, Port Jackson.

NOTE.—I have dredged in Port Jackson numerous specimens of this Sponge. It appears to be very abundant.

57. SPECIES CHONDRILLA PAPILLATA. Nov. spec. Fig. 13—16.

This species is characterized by the very peculiar roughness of the surface. The Sponge is lobate and massive, not lamellar or globular as the other species generally. It appears somewhat like a hornsponge (fig. 13), in consequence of its erect shape and the papillæ on its surface.

It consists of a central mass from which cylindrical or slightly flattened processes extend upwards. The whole Sponge attains the great diameter of 60 mm. (height.) The processes measure 10—14 mm. in diameter.

The Oscula are situated terminally on these finger-shaped processes. They are circular and have a diameter of about 2 mm. There exist no "chimneys" around them.

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(1) *H. Carter.* On two new species of Gumminæ. Annals and Magazine of Natural History, IV. Series. Vol. XII., p. 23, pl. I., fig. 10—14, 16.

The whole surface is greatly roughened in consequence of papillæ, which stand very close projecting from it all over the Sponge. (Fig. 13, 14.)

These papillæ are spherical, 1 mm. in diameter, and attached to the Sponge surface with a broad base, which is slightly smaller than the equatorial diameter. They appear as $\frac{2}{3}$ of spheres and stand so close to one another, that the spaces between them are always smaller than their own diameter. In some parts of the surface they even touch.

In internal structure this Sponge shows an aberrant peculiarity.

The spicules are of two kinds as in the foregoing and the following species. There are spherical spicules with short, sharp conic spines; and stellate spicules with slender, conic, serrated spines fig (15-16).

The *spherical spicule* measures 0·019 mm., across, the spines 000·3 x 0·002 mm. The *stellate spicule* 0·013 mm., across, the spines 0·008 x 0·0015 mm.

Both kinds of spicules are met with, scattered throughout the whole of the Sponge rather scarce. In the papillæ however the spicules are massed (fig. 14) so that the distance between the spicules is about equal to their diameter. The spicules lie here three or four layers deep. In this part of the Sponge the spherical spicules predominate very much over the stellate ones. In the Pulpa the difference in number of the two is slight. If there is any perceptible difference the stellate form predominates.

The colour of this species in spirits is a uniform light mélange or brown. The interior has the same colour as the surface, only in a lighter shade.

Locality: East Coast of Australia, Port Jackson, Ramsay.

58. SPECIES. CHONDRILLA CORTICATA. Nov. spec. Fig. 17-20.

This species is characterized by its extremely hard outer surface.

It has as yet only been found in the shape of rather thin lamellæ, which are peculiarly bent and curved so as generally to attain the shape of a cup (fig. 17).

The flat extended Sponge measures, full grown, 70 mm., in length, and 40 mm., in width. It is the largest of the Australian Gumminæ I have seen. The plate is of uniform thickness throughout measuring from 10-12 mm.

The outer surface is smooth. The whole Sponge has a light brown colour. The oscula are few in number, about seven to a large specimen, circular and slightly drawn in, that is to say at the bottom of slight funnel-shaped depressions in the surface, and surrounded by a ring-shaped slight elevation. Sometimes they lie in the plane of the surface.

The interior of the Sponge is coloured a little darker than the Cortex. A transverse section shows that the canals in the pulpa are more numerous and smaller than in other species.

The structure of the inner parts afford no peculiarity. The Cortex, however, is of great interest.

There are two kinds of spicules in this species as in the foregoing one. Spherical and stellate ones.

The *spherical spicule* measures 0·015 mm. across; the spines are particularly short, broad, conic and truncate, with very sharp points they measure 0·001 mm. in height and are at the base 0·0015 mm. thick.

The *stellate spicule* measures 0·01 across; the spines are mostly smooth and generally taper to one fine and sharp point, they are slender and conic, measuring 0·004 mm. in length and at the base 0·0008 mm. in width.

In the pulpa we find both kinds of spicules distributed pretty evenly with a slight preponderance of the stellate spicules. The spicules are scarce and on thin sections very far apart.

In the outer part of the Cortex, just below the outer surface we meet with a regular hard pavement of the spherical spicules which lie closely packed in three or four layers above one another. They lie as close to one another as their spherical shape will allow, and their spines are interposed with one another in such a manner that the whole pavement attains a high degree of firmness. Similar cortical layers are known of many Sponges. No species of Gumminæ possesses them so highly developed as this Chondrilla corticata.

Locality : East Coast of Australia. Port Jackson.

EXPLANATION OF PLATES. I. TO V.

Fig. 1.—Bajalus laxus. R. v. L. A specimen of the variety with lobate processes. Natural size drawn from life.

Fig. 2.—Bajalus laxus. R. v. L. A specimen of the variety with finger-shaped slender processes. Natural size drawn from life.

Fig. 3.—Bajalus laxus. R. v. L. Transverse section through a process of the variety with slender outgrowths, 1:20. An outer trabecular reticulate zone, *(d)* can be distinguished and large conic inhalent Canals *(i.)* The exhalent Canals *(e)* are much narrower, extending more or less radially, these are cut obliquely, and therefore appear very oval in the section. The interior *(l)* appears lacunose, and can be considered as a wide Canal (like the central tribe of the Syconidæ) traversed by threads of tissue *(t.)*

Fig. 4.—Bajalus laxus. R. v. L. Distal part of the transverse section through a slender process 1:450. The inhalent pores (*p*) are covered by a thin perforated plate externally, (*a*) which is perforated by numerous small pores (*p*), leading into the pore (*P.*) Below the outer skin (*b*) a wide sub-dermal cavity extends all round the Sponge (*f*), which is traversed by numerous anastomosing and repeatedly ramified threads (*c*). All these parts are covered by flat Ectodermal Epithelium cells (*e*). In the skin and in the Sub-dermal threads we find amœboid wondering cells *(d.)* In the skin below the outer surface glandcells *(g)*, the water flows partly direct from the Sub-dermal cavity, and partly by way of large

conical inhalent canals *(I)* into the ciliated chambers *(f)*, which possess apparently from 3—5 inhalent pores at their distal rounded ends, exclusively *(h.)* Amœboid wondering cells *(d)* are also found in the Mesoderm between the ciliated chambers.

Fig. 5.—Bajalus laxus. R. v. L. A portion of the thread network in the central Gastral cavity of the Sponge. The thread is filled with Spermospores containing numerous Spermatozoans each, 1,000:1.

Fig. 6.—Chondrosia Ramsayi. R. v. L. Half a middle sized, flat specimen, in natural size drawn from a spirit specimen from the Australian Museum. The Oscula are slightly raised above the rest of the surface, but not surrounded by an incurved fringe as in Osculina.

Fig. 7.—Chondrosia Ramsayi. R. v. L. Transverse section, vertical to the upper surface 1:20. A cortex is well defined, *(c)* outwards it is dark colored *(b)*, and full of pigment granules, below it is light and transparent. The Pulpa *(p)* is colored much darker and very intransparent. Below the surface there is a layer of small anastomising irregular tangental canals, which form a kind of subdermal cavity *(i)*. They unite to form large likewise tangental inhalent canals *(t)*. From these small inhalent canals of a more or less radial direction originate the ramifications of these bear the ciliated chambers. The inhalent canals *(e)* unite to form large lacunose canals leading into the Oscular tubes.

Fig. 8.—Chondrosia Ramsayi. R. v. L. Transverse section through the Cortex showing the structure of the subdermal cavities and the distribution of pigment 1:200.

Fig. 9.—Chondrosia Ramsayi. R. v. L. Section through part of the Pulpa 1:80. Inhalent branch canals (*i*). Ciliated spherical chambers (*c*). Exhalent canals (*e*).

Fig. 10.—Chondrilla secunda. R. v. L. Drawn from life in natural size.

Fig. 11.—Chondrilla secunda. R. v. L. A large spherical spicule 300:1.

Fig. 12.—Chondrilla secunda. R. v. L. A small spherical spicule 300:1.

Fig. 13.—Chondrilla papillata. R. v. L. Natural size, drawn from a spirit specimen.

Fig. 14.—Chondrilla papillata. R. v. L. Transverse section through outer zone, showing a Papilla densly filled with spicules 70:1

Fig. 15.—Chondrilla papillata. R. v. L. Spherical spicule. 300:1

Fig. 16.—Chondrilla papillata. R. v. L. Stellate spicule. 300:1.

Fig. 17.—Chondrilla corticata. R. v. L. Natural size, drawn from life.

Fig. 18.—Chondrilla corticata. R. v. L. Transverse section through the outer zone 60:1, showing the dermal pavement skeleton.

Fig. 19.—Chondrilla corticata. R. v. L. A spherical spicule. 300:1.

Fig. 20.—Chondrilla corticata. R. v. L. A stellate spicule. 300:1.

THE METHOD OF SECTION-CUTTING WITH SOME IMPROVEMENTS.

By R. von Lendenfeld, Ph.D.

It is a well-known fact that the structure of many organs of plants and animals cannot be investigated without getting a direct insight into the interior. It is easy enough to place a small portion of the interior of any organ under the microscope, but it is impossible in that way to ascertain the mutual position of parts. To enable the observer to study them under the microscope and in sufficient connection with other parts, so that their position can be defined, there is only one method, that of section cutting.

Organs of plants and a few hard parts of animals can be cut as they are. It is advantageous to place such in a slit made in a cork and cut them together with the adjacent cork with a sharp razor. In cutting sections of plants, which are damp, it is necessary to wet the razor so that the section, when cut, can immediately be immersed in water and so prevented from drying and shriveling up.

Soft animal parts must be hardened. Any one of the methods described in my paper on the preservation of tender marine animals (proceedings of the Linnean Society of New South Wales, Vol. IX.) can be used. The result will in every case be that the hardened organ will be preserved in strong spirits, with which it will also be saturated. The other methods of cutting with the hand, and hardening and embedding simultaneously, and the freezing method, do not seem to yield such good results as the one to be described below.

Brothers Hertwig (Das Nervensystem und die Sinnesorgane der Medusen) have made use of the former of these two methods. They placed the specimen, after it had been treated with osmic acid and stained with alum-carmin in a solution of gum-glycerine, and enclosed it between bits of fresh liver. The whole was then placed in strong spirits, where the liver, together with the gum-glycerine, got very hard, and enclosed the specimen which was afterwards cut by hand. This method is an old one, and has often been used before for less tender animals than those, to which the brothers Hertwig have applied it, namely, the small jellyfish.

Sollas (Sponge Fauna of Norway, Annals and Magazine of Natural History, 1879) recommends the freezing Microtome. The specimen is placed in glycerine-gelatine and hardened, not by the influence of spirits of wine but by cold, which is produced by a small refrigerating apparatus. The specimens treated in this way are cut by a machine or Microtome.

Both the sections cut in liver and with the freezing Microtome cannot be placed in Canada balsam but must be kept in glycerine or gelatine and are consequently liable to attain too great a transparency in course of time and also to get dim in consequence of the growth of Bacteria under the cover glass.

The method which is recognised as the very best by most microscopists is the one which I have been using and improving for several years, and a description of which follows.

THE SPECIMEN.

It is of great importance that as small a piece as possible should be cut out of the organ, that all unnecessary parts should be cut away and the whole thing cut into such a shape that it will afterwards be easy to find out what position the specimen had in the organ from which it has been taken.

HARDENING.

To small and tender organs *osmic acid* can be recommended as yielding better results than any other re-agent known. The specimen is placed in a solution varying in strength from 0·5—2% and left there for a short time. Both time and strength depend on the nature of the organ which is to be cut.

Corrosive sublimate, a concentrated solution to be used, which may be made stronger by warming. The specimen, if tender, should be dipped in the solution if warm and left a short time if cold. Tough organs can remain for some time in the solution. Wilson (On Alcyonarians, Mittheilungen der zoologischen Station in Neapel, 1884,) recommends to leave soft corals for several hours in a warm concentrated solution of corrosive sublimate. For most purposes this will be too strong.

Picric acid solution or a mixture of it with sulphuric acid diluted has been used by many with good results, so particularly Kleinenberg (Hydra). It is particularly good for staining nervous fibres which are coloured yellow by it.

Chromic acid or Bichromate of potassium in dilute solution is used for brains to great advantage.

Chloride of gold 1% solution colours nerve fibres and tissue cells and the intercellular substance.

Nitrate of silver is reduced by the intercellular substance and eventually turns it black so that the limits of the cells can be made clearly visible.

Chloride of Palladium hardens the tissue and colours, muscular fibre brown. Cloride of iron has also been reoommended for hardening the tissue.

Most metallic salts have some influence or other on the Protoplasm, and in every case the metal enters into combination with it, changing its colour and making it hard.

A specimen treated with one of these re-agents will stand washing in distilled water without any perceptible change taking place.

STAINING IN TOTO.

The specimens should be stained, because the colour not only makes certain parts more distinct, but also counteracts the noxious after effects of the hardening re-agents. Osmic acid, gold, and other specimens, invariably commence to darken after some months if they have not been stained.

The specimens can either be stained when whole, or the sections can be coloured. The staining in toto saves much trouble and time, and is also advantageous, because the sections have not to be handled so much. On the other hand the staining in toto has two great drawbacks. Firstly, it very often happens that with every care the colour does not penetrate to the centre of the specimen, and even if this result has been attained it is very difficult to stain the whole specimen in a uniform manner; the outer portions will generally be stained in a greater degree than the inner ones. Secondly, it is necessary to keep the specimen in the colouring solution for a long time to attain thorough staining, and it is very difficult with most colouring liquids to prevent maceration from spoiling the whole specimen. Even if the specimen is kept on ice the epithelia will often be loosened and the whole thing spoilt if the specimen is left in the staining solution over night.

In a hot country such as this it is difficult to prevent this.

Any colour in solution will do for staining, and a wide scope is left to the microscopist in this field.

Aniline dyes have been extensively used of late, but although they are of great help to those who study bacteria, they have not yielded any good results with higher organisms. Eosin, Fuchsin, Bismarckbrown, &c., have been tried. They stain very rapidly, and diffuse through the tissue with greater rapidity than any other colouring fluid. The fault they have is, that they stain everything in the same way and nearly in the same degree, so that one sees in a section stained with aniline dye hardly more than in a section not stained at all.

Carmine, in different solutions, is a very much better colour. It stains the "chromatin" of the protoplasm very much, and all the other parts of the tissue only faintly. We know in what kind of cells and parts thereof this chromatin is contained, and we can therefore attain a clearer insight into the structure of any specimen by colouring with carmine, than we could with the investigation of not coloured sections. The carmine can be dissolved in various ways—I refer the reader to text-books on Histology, mainly Renvier—the solutions I have found best are those in alum and picric acid. Carmine powder is dissolved in a concentrated solution of alum when still hot and immediately filtered; a deep red solution passes through and can be used as it is, or for very tender specimens diluted with 50 % of destilled water. This alum-carmine stains the nuclei of all cells; the ova spermatozoa and ganglia cells, and also muscular and gland cells very intensely, whilst it gives to the ordinary connective tissue only a slight red tinge.

Picric-acid-carmine is a most excellent colouring fluid for the tissue of higher animals. It stains like the foregoing, the nuclei, ganglea cells, &c., red, but the picric acid in it at the same time colours the horny substance of the skin and also nerve fibres intensely orange-yellow.

Hæmotoxylin is also an excellent staining fluid, prepared according to the Kleinenberg. It stains the ordinary protoplasm light violet and the nuclei dark violet, nearly black.

I refer the reader who may wish to collect some further particulars on this subject to the standard works on Histology by Renvier and Klein.

PREPARATION.

After the specimen is coloured it must be well-washed so as to remove all colouring matter, which has not entered the protoplasm or other parts of the specimen in a fixed combination.

Cold water will in most cases be the best thing. For Haematoxylin, spirits.

When the specimen is washed it can either be imbedded in gum Glycerine, frozen and cut forthwith or imbedded in gum glycerine enclosed in liver, hardened in spirits and cut with the hand as described above, or also prepared for imbedding in paraffin.

I, together with many other zoologists, consider the paraffin imbedding method to be far superior to any other.

The first thing to be done with the washed specimen to prepare it for imbedding in paraffin, is to extract all the water from it by means of alcohol. This is a very difficult operation in the case of very tender specimens, and requires great patience and care.

If the specimen is placed in strong spirits immediately it will shrink and become totally useless, because the water is extracted from it by the strong hygroscopic spirits with such great violence.

It is therefore necessary to place the specimen in a series of mixtures of alcohol and water, getting continuously stronger until it is placed in pure absolute alcohol.

It is always connected with difficulties to procure this latter, wherefore I recommend it to the workers in the colonies to make it themselves. Ordinary strong *not methylated* spirits of wine are mixed with quick lime, which will absorb all the water, and the pure absolute alcohol can be distilled from this mixture of spirits and quicklime. In this way the spirits which have been used can always be utilised again, and the whole process will save a great deal of expense in the course of time.

Good non-methylated spirits of wine must be procured, and its percentage of alcohol ascertained. The spirits of wine consists of a mixture of water and absolute alcohol; the percentage of which is expressed in a most unpractical and clumsy way by the term x over proof. By means of an areometer it is easy to ascertain the percentage of alcohol in the spirits. This mixture can then be mixed with absolute alcohol or water, and any desired strength produced.

I can recommend the following mixtures for practical use, 30%, 50%, 70%, 90%, 100% of Alchohol in 100 parts of the mixture.

The specimen, when washed is firstly placed in 30% alchohol, left there several hours, then in 50% left there for some hours, then 70%, 90% and finally 100% or absolute alcohol and left in each mixture 2-4 hours. In the absolute alcohol, which ought to be changed once or twice, 12 hours to a day.

In this way it is possible to get all the moisture out of the tenderest specimen without it shrinking.

The specimen is then placed for a few hours in a solution of alcohol in ether and finally in ether, where it again should remain for a day. The specimen will lie at the bottom. Chloroform is then poured into the ether (Giesbrecht) and being much heavier than the latter it sinks down to the bottom, whilst the ether swims on the surface. The specimen then lies between the two, below the ether and above the chloroform. The ether contained in the specimen is slowly exchanged for chloroform and, finally, when nearly all the ether is replaced, the specimen sinks down to the bottom. It can then be removed and placed in fresh pure chloroform and left there for 12 hours.

It is now ready for imbedding.

THE IMBEDDING IN PARAFFIN.

The imbedding is also a process which requires much care, patience and experience. If the beginner often loses his specimen in consequence of the want of the latter, he need not be disheartened or ashamed; this happens repeatedly to every one, and I have seen even men like Lang and F. E. Schulze spoil their specimens in imbedding.

I have found it advantageous to place the specimen for a day or two in molten soft paraffin and keep the latter liquid and at the uniform temperature of 47—49° C., in a self-regulating water-bath stove. During this time all the chloroform has escaped and the specimen can be placed in another little cup with molten hard paraffin kept at a temperature not exceeding 58° C. Pretty hard paraffin will melt at that point. It can be left there for an hour or so and can then be imbedded. A trough of paper or brass measuring $1\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2}$ inches is filled with molten hard paraffin and at the time when it commences to solidify the specimen is placed in it. The "freezing" surface is kept open by heated needles and the specimen is put in position by the same implements

It is of the greatest importance to put the specimen in such a position that the desired direction of the sections can be obtained by cutting the paraffin stick, cast in the trough straight across that is vertical to its longitudinal axis. This is often a matter of great difficulty, and it will always be of advantage to throw a ray of reflected and concentrated sunlight into the molten paraffin, so as to illuminate the specimen properly. It is of course most convenient to cut to an elongate shape before in such a manner that one can tell the position in which it ought to be imbedded by the outer shape of the specimen.

CUTTING.

The paraffin block should cool down slowly, and be made as cold as possible before cutting. The colder the paraffin the harder, and the harder the better.

Caldwell recommended a very ingenous method of cutting sections which has been adopted in several places, but which is in practice by no means so beautiful as in theory.

He encloses the hard paraffin with a thin coating of soft paraffin, and in cutting, the one section sticks to the *opposite margin* of the other. If cutting is continued a "ribbon" of sections is produced which can be caught up by a moving bit of tape, and portions of which can be cut out showing continuous series of sections.

The Paraffin block can be either cut by the hand or placed in a section-cutting apparatus termed a Microtome, and cut either by hand or automatically.

Cutting with the hand has been nearly universally abandoned (Leuckart), and the Microtomes are used for the purpose. The principal always is, that the knife moves backwards and forwards whilst the paraffin block is slowly raised. Or the knife is steady and the paraffin block rises and moves backwards and forwards at the same time. (Caldwell.) In the simpler instruments, one moves the holder of the knife backwards and forwards in a metal groove with the right hand, and raises the specimen to be cut, with the left either by pushing it up along an inclined groove. (Leiser), or by turning a screw (the common form.)

Automatic Microtomes are made by the Cambridge Mechanics' Institution, which can be worked by water power or by treading, and the model has been copied by many with diverse alterations. These automatic instruments yield very excellent results as long as they are in order, but being so complicated they are apt to get out of order. These are all adapted for the ribbon method and sections of any desired thickness that is to the limit at which the sharpest razor at a certain angle will cut can be made in continuous series of specimens, measuring two inches across.

To all these instruments the same remarks apply, and everywhere the same difficulties are encountered.

The success of making good sections depends firstly on the quality and secondly on the position of the knife. No expense should be spared to obtain the best razor possible for the purpose. The knives, which are sold specially for the purpose, are always bad and utterly useless.

The razor can be fixed either at right angles to the direction in which the knife is moved, or obliquely. The opinions as to which is the best differ. Caldwell and I use the knife vertical to the direction of the motion. Further the plane of the knife itself can be altered so that the cutting edge dips more or less downward. With an angle of about 12° to the plain in which the knife moves the finest sections can be cut. The difficulty of having the knife so steep is that then the sections tend to curl up.

This latter is a great evil and not altogether overcome by the appliance of an outer carting of soft paraffine as recommended by Caldwell.

F. E. Schulze has in recognition of this difficulty of the curling up of the sections constructed an apparatus which prevents it to a great extent, so much so, that if Schulze's method is combined with Caldwell's one can be pretty sure of obtaining good sections.

A smooth round rod is fixed to the knife in such a manner, that it lies parallel to, and just above the cutting edge so that any section cut must pass through between the blade of the razor and this rod, which can be attached by springs or screws to the back of the knife.

I would recommend therefore that such an additional apparatus be added to any of the Microtomes in trade.

The outer coating of soft paraffin can be produced in a most simple manner.

When the paraffin is cold and hard, all the unnecessary parts around the specimen are cut away with a knife so that only a millimetre of paraffin is left on every side of it. The top is then removed. The lower end, which is subsequently fixed in the paraffin-holder of the Microtome should be cut down just to fit into the holder.

When this has been done the top of the paraffin-stick containing the specimen is dipped into a freezing molten mass of soft paraffin and instantly withdrawn.

The desired coating of soft paraffin will then be found on the outer surface.

There should always be *continuous series* of sections cut and mounted, one after the other. For certain things, and particularly for a preliminary investigation, this is not necessary to such an extent, and it will save time, trouble and material, if in such a case every second section is cut thick and thrown away, and every second cut to the required fineness and mounted.

The thickness of sections is a point on which a great deal depends. The mutual position of whole organs or groups of cells can generally be ascertained much better by means of thick sections and low powers, than by means of the very fine sections.

For histological detail a section is rarely too fine. The thickness required varies with every case, and the thickness to choose must be left to the investigator and his experience.

For an investigation into the structure of a rare and valuable specimen, a continuous series of sections might perhaps be recommended, which are alternately very thin—as thin as they can be made—and of medium thickness, perhaps 0·005—0·02 mm.

MOUNTING.

The sections when attached to one another as a ribbon, can be placed on a slide by cutting a portion of the ribbon corresponding in length to the size of the slide off, and placing it there. Other wise it is necessary to place the sections as they are made, one after the other on the slide. It is hereby very important, that they all should be parallel to one another.

Before placing them on the slide, the latter must receive a coating of shellac. White shellac is dissolved in absolute alcohol and allowed to stand. A sediment will form and the clear solution can be poured off. This is put on to the slide with a brush just before use.

The sections are placed on the slide as soon as the shellac film is dry and the whole slide then placed in the water-bath stove, where it is just so much heated as necessary to soften and partially melt the paraffin and to soften the shellac, about 55°—60° C. As soon as the paraffin has melted, the slide is immersed in a flat dish, filled with spirits of turpentine. The sections adhere in consequence of the shellac to the slide, the turpentine dissolves and removes the paraffin. The slide can be taken out of the turpenine bath at convenience, but with great care so as not to create a strong current of turpentine on its surface, which might wash some of the sections off and so spoil the series.

If staining is not required, the sections are now ready for mounting in Canada balsam. The best way is to drain off the turpentine by holding the slide upright and wiping the margin, then to put drops of a Canada balsam or Damar resin on the sections and finally to cover with the cover glass.

Caldwell and others use slides 6 x 2, with cover glasses of exceeding thinness and nearly equal size, which I can warmly recommend.

The ordinary cover glasses on sale here, are much too small and much too thick for any fine work.

The Canada balsam or Damar resin, the latter is to be preferred on account of its white colour, should be dried in the oven but not heated above 75° to prevent the Canada balsam from turning brown, which it invariably does if heated too much. When dry, brittle and hard, the resin or Canada balsam, is dissolved in chloroform. A mixture of 50 % Canada balsam or Damar and 50 % chloloform has the most convenient consistence, and will get hard in an hour on the outer margin and never cracks.

The mounted sections should be left until the free margin ol the resin has consolidated and then they can be examined.

As a hint to beginners, I would add, never omit to let the sections pass under a low power both at the beginning and at the termination of the examination.

STAINING THE SECTIONS.

I have alluded above to the difficulties connected with staining in toto, and will now dwell on the staining of the sections. They are of course made just in the same way as described above. The staining process is omitted. The specimen is placed in the weakest alcohol, as soon as the hardening re-agent has been washed out. The further process as above until the sections on the slide are taken out of the turpentine bath. Haswell uses colours mixed with turpentine or similar oils for staining his sections an equally simple as commendable method. The slides are removed from the turpentine bath and placed in a solution of the desired colour in turpentine or any oil. Any transparent oil-colour can be used for the purpose. Carmine yields also here very good results.

The ordinary staining-reagents can also be used, but this requires a complicated and to the sections injurious process of washing. The turpentine must be washed out with absolute alcohol. This must be replaced by spirits of wine and finally water. Then the sections are stained, after which they must be washed, and treated with increasing strengths of alcohol as before, finally they must be covered with clove oil and then mounted in resin as above. If the staining is performed with an oil-colour, the sections are immersed for a few minutes in the colouring matter, and then replaced in the turpentine bath and afterwards mounted as above.

AMŒBA PARASITICA. A NEW PROTOZOAN INFESTING SHEEP.

By R. von Lendenfeld, Ph.D.

(Plate VI.)

Some weeks ago I was commissioned by the Hon. the Minister of Mines to investigate some diseased sheep in two different localities in New South Wales, at Quirindi in the Liverpool Plains and near Young.

I forwarded my reports in due course to the department, but thinking that my researches might also be of some general scientific interest I publish them here.

The sheep are affected by a disease which appears very similar to epithelial cancer and was met with on the feet behind the hoofs and also on the lips and nostrils and the gums of lambs.

The epithelium in these places grows with pathological rapidity, the horny layer produced soon attains a thickness of 3—5 mm., the wool drops out in the deceased parts and below the thick outer layer a festering process sets in.

After some time a new Epithelium makes its appearance below the festering layer. Then, provided the lamb does not die, the thick horny layer is thrown off like scurf and the Epithelium below attains new wool and replaces the old skin—the lamb has recovered.

In studying the circumstances in which these sheep live, I found, that they invariably were exposed to being wounded in some way or another in those places, which eventually developed the disease, —blistered by standing on rocks heated by the sun after they had been standing in water for several hours or pricked by the spines of the variegated thistle under the shade of which they had, in consequence of the prevailing drought, to find their food.

These traumatic influences are not, however, the actual cause of the disease. It is produced by an Amœba which enters the wounds and multiplies rapidly in the Epithelium causing very strong irritation.

On the one hand the sheep are continually rubbing the diseased parts, and on the other, the microscopic investigation shows, that the Rete Malpighi in those places is highly inflamed, extending centrifugally so as to form large protruberances and rapidly producing Epithel-cells, between the successive layers of which the parasite is imbedded and so rendered harmless. The disease is very infectious. Burning out the affected places and dipping in poisonous solutions have been found in some cases reported to me to yield good results and to accelerate the healing process, at the same time diminishing the percentage of deaths. This treatment I had previously recommended in my report to the department.

Between the layers of horny substance which are either concentric and thimble-shaped (fig. 1), or show an alveolar reticulate structure (fig. 2.), I discovered granular masses with a nucleus in each, and of course was inclined to consider them as the eggs of some parasitic insect, particularly in consequence of their large size 0·05—0·1 mm. On examining extensive series of sections I found, however, that they never developed into insects, and further that they evidently multiplied. I found (fig. 3) on several occasions the granular mass divided into two portions, with a nucleus in each part. Never were there more than two nuclei in one and the same granular mass.

In the cases where the small wart-shaped excrescences of the skin, with which the disease always begins, had a reticulate structure (at Young) (fig. 2), the granular masses were found in several layers in the proximal part only, whilst the meshes of the distal part of the network (fig. 3) were empty.

In the cases where the protruberances consisted of concentric layers (at Quirindi) (fig. 1), there existed occasionally also in the distal part some small empty spaces, but mostly the granular bodies filled all the spaces between the horny layers. Here however, the granular masses in the distal part had evidently undergone a change. No nucleus could be detected in them, and they were not nearly so readily colourable as the proximal ones with the nucleus.

I assumed on the ground of these observations that a parasitic protozoon of some kind or another entered the wounds mechanically made in the tender skins of lambs and there multiplied.

I subsequently made some experiments to find out whether this assumption was correct, as follows :—

The scurf in the lower portion of which there were many granular masses, with nucleus, was placed in fresh water in a small aquarium.

A small portion of the skin of a sound lamb was placed in a similar aquarium filled with water from the same source (boiled rain water.)

Infusoria and Bacteria made their appearance in both aquaria after a few days, but in the one with the diseased scurf only I found after four days several Amœbæ, in shape similar to an ordinary lobate Amœba. (Fig. 4.) These were most numerous after six days, and then rapidly vanished, so that there were apparently none left in ten days.

I believe I am justified in concluding from this observation that the cause of the disease is an Amœba, which I name, accordingly to its mode of life, Amœba parasitica, which, however, does not differ morphologically from the well-known, and as I believe, cosmopolitan Amœba princeps of Ehrenberg.

It is well-known that several fungi, in certain stages of their life, appear very similar to Amœbæ, and so it is not impossible that my Amœba is in some connection with them. I do not consider this probable, however, as I made no observation which might lead one to suppose that the Amœba ever divided into a multitude of swarming spores.

EXPLANATION OF PLATE VI.

Fig. 1.—Part of diseased skin; a protruberance, with concentric layers from the lip of a lamb at Quirindi. Chromic acid, picric acid-carmine, longitudinal section. C., Oc. I.

Fig. 2.—Part of the diseased skin; a protruberance, with reticulate structure, from the nostrils of a lamb at Young. Chromic acid, picric acid-carmine. DD., Oc. I.

Fig. 3.—Amœba parasitica multiplying by fission fresh. F., Oc. I.

Fig. 4.—Amœba parasitica bred in the aquarium alive. F., Oc. I.

METEOROLOGY OF MOUNT KOSCIUSCO.

By R. von Lendenfeld, Ph.D.

During my recent expedition to the central part of the Australian Alps, I made some observations of interest regarding the Meteorlogy of that part of our colony.

In a recent map showing the quantity of rain in various parts of New South Wales and Victoria, published in Victoria, it is stated that there is *less rain* on Mount Kosciusco than either north or south-west. This is a statement contradictory to alpine experience and it is partly to show the fallacy of it, that I have written this paper.

The nearest meteorological station is Kiandra and more rain falls there during *every* season than during the corresponding lapse of time in any other station in New South Wales or Victoria.

On approaching the mountain one immediately perceives that there must be plenty of water there as the rivers which drain the mountain are large and full even in a time of drought.

Coming down the mountain I measured the Snowy River above its junction with the Crackenback and found that over 2,300 cubic feet of water passed there per minute, at a height of 2,952 per feet. When the river is high this amount is greatly increased; then the stream conveys at that point about 1,000,000 feet of water down the valley per minute. This river drains an area of about 500 square miles and so it is quite clear that that area cannot be suffering much from drought.

This area forms the main part of the Kosciusco-plateau extending 40 miles north of Mount Townsend.

The valleys on this plateau through which the tributaries of the Snowy River flow are so wet and boggy that it is with great difficulty that one can get along through them. On the plateau itself there is an abundance of beautiful clear rivulets, each strong enough to turn a mill. Most of these arise from the bogs in the valleys, some originate in lakes. There are no springs. The amount of water which comes from the melting of the snow-fields during the dry season is very small.

The extensive melting of the snow in spring makes the rivers rise at that time of the year.

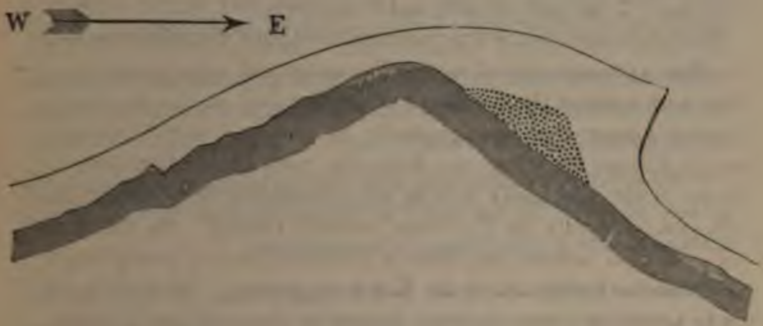
All these facts show plainly that there must be a very great amount of aquaeous precipitation there during the year, and I do not think that I am far out in estimating it at 100 inches to 120 inches per annum.

All this water water comes down in three different shapes :— 1 as rain ; 2 as snow or hail, and 3 as dew.

The rain is not always a pronounced downpour, but often nothing else than a precipitation of mist. The amount of water precipitated from mist without the formation of regular rain in the mountains is much greater than one generally assumes. I have frequently seen in Europe the water run down the roofs of the Chateaux de Chasse or the shepherd's huts in the mountains in a fog without rain, just as rapidly as if it were actually raining. As the Surveyor-General informs me, there is a similar kind of precipitation sometimes met with also on the Kosciusco plateau. From this wet fog to actual rain there is every transition form of precipitation, depending entirely on the height of the clouds. If the clouds hang on the mountain, then there is no rain, if they are high the rain is pronounced.

I have made extensive inquiries as to the amount of rain of the old residents in the district, and found that they all agree in saying, when it rains below it invariably rains or snows above; and that it also rains or snows above however, often when it is fine below.

The snow falls all the year round in heights above 5,500 feet on the Kosciusco plateau. For eight months in the year it probably never rains on the highest elevations. In midsummer, however, there is rain also there in the warm weather. The snow lies on the greater part of the plateau from 5 to 8 months in the year according to the height. There is no spot however, where the fall of snow in winter and spring exceeds the amount melted during summer and autumn. Consequently, the snow lies only there, where it has been piled up by wind in snowdrifts. The remnants of such drifts last through the summer. They appear as bands often interrupted, following the ridges about 20 feet below the summit, and 30 to 50 feet broad on the southern and eastern slopes, as stripes and patches in a line parallel to the summit line, fringing the upper margin of the south-eastern slopes. Such little snowdrift patches are met with in all suitable places above 6,500 feet.



Similar snow patches formed in a homologous manner are formed everywhere, where the mountains attain a sufficient height. They form the most striking peculiarity of those mountains in the European Alps, which attain a height of about 9,000 feet. There such eternal snow patches are, however, not found below 8000 feet. These alps lie in lat. 47° N. If we compare this with the fact that on Kosciusco homologous snow patches are found in 37° S. and 1,500 feet lower, we must come to the conclusion that also in Australia, as in New Zealand and Patagonia, it is either colder or damper or both than in the northern hemisphere at corresponding latitudes. The snow patches come down to about 6500 feet in Europe in lat. 52°, that is 15 degrees further away from the equator than Mount Kosciusco. This result is only in so far interesting, as it shows that Australia, with its hot and dry continental climate, is no exception to the rule of the greater amount of cold and wet in the Southern Hemisphere.

Perhaps the most important of the aqueous precipitation is the dew. I have never in any part of the world at any height between 1000 and 15,000 feet experienced such dews as every night at our camp on the Kosciusco plateau. The whole plateau covered by a thinner layer of air than the low lands around, is of course subject to very extensive radiation during the night and gets so cold towards the morning that it freezes there above 5,500 feet nearly every clear night in the year. During our stay in the middle of January it was very warm in the day but invariably froze at night.

The sea breeze coming up of an evening to replace the heated air in the centre of the Australian continent is comparatively warm and saturated with moisture.

It blows up the eastern slopes of the plateau and encounters its ice cold surface. It can easily be understood how an exceptional amount of dew is precipitated in consequence.

This dew freezes and fresh dew is deposited on the ice. In this way a coating of ice, about a sixteenth of an inch thick, was formed on our tin plates which I left outside the tent over night for the purpose of ascertaining the amount of dew.

Our tent was frozen as hard as a weatherboard cottage every morning and could not be packed until the rising sun had melted the ice attached to it.

It will appear from these statements that as one might a *priori* expect, the Kosciusco plateau is blessed with a great amount of aqueous precipitation and that the abundance of crystal clear water in the streams draining it can easily be accounted for.

I should like to add a few remarks concerning the exceptionally wet weather we have had the last few days, namely, from January the 17th to the 25th. On the morning of January 11th, when we were in Bett's Camp nearly 6,000 feet high, I observed the formation of high clouds in the S.E., and their approach towards the N.W., subsequently they vanished. There is no surer sign of continuous and extensive rain approaching than that.

On that day and the following, it was very fine, and also the morning of the 13th was cloudless in the mountains. The next was fairly fine in the morning. There were very high clouds all over the sky. This together with the foregoing observations, enabled me by my old alpine experience to foretell a regular extensive rain, which also set in. It is of course, not here to decide how often a mistake would be made by a forecast of this kind; but two conclusions can at all events be drawn from the fact, that I did foretell the rain. Firstly, that European experience also holds good in Australia; and secondly, that no place is so well adapted for the erection of a meteorological station as these high mountains, as one is nowhere else in so good a position to make a forecast as there; where in consequence of the elevation, one is nearer the clouds, and in most cases probably close to the place—on the main dividing range, where the rain is brewed.

THE GLACIAL PERIOD IN AUSTRALIA.

PLATES VII. AND VIII.

BY R. VON LENDENFELD, PH.D.

INTRODUCTION.

During a recent expedition to the central part of the Australian Alps I have discovered undoubted traces of ancient glaciers, and can assert accordingly that Australia also has passed through a glacial period.

Before entering into a description of my discoveries, I think it my pleasant duty to express my thanks to those who materially assisted me in the accomplishment of my work, by lending me instruments and maps, and many other services.

The Hon. Mr. Abbott, the Minister for Mines, supplied me with railway passes, for which I am particularly indebted to him. The Surveyor-General supplied me with several instruments and maps, and I am also indebted to him for many practical hints drawn from his own experience on the mountain.

Mr. Wilkinson, the Government geologist, supplied me with instruments and his assistant, Mr. Cullen, rendered me invaluable services during the expedition; also in other ways Mr. Wilkinson aided me very much in my research. The greatest practical assistance was rendered me by Mr. Betts, the district surveyor at Cooma, to whose energy and chivalrous courtesy alone our advance was made possible, and the difficulty of getting along the bulky luggage, provisions, instruments, &c., overcome.

LITERATURE.

In literature there are a few statements regarding the ancient glaciation of Australia, but they are all very vague or made by people of not sufficient practical alpine experince. I shall review what I have found in a few words.

Tenison-Woods (1) says—"There is no satisfactory evidence of a former participation in the great ice age by the continent of Australia. One or two instances of grooves or striations are recorded, but standing alone in so vast a territory the ice origin is very doubtful."

Howitt (2) says—"Nowhere in Gippsland have I been able to detect any appearances which I could in any away refer to a glacial period, analogous to that of the Northern Hemisphere. I have nowhere met with grooved or scratched rocks, erratic boulders, moraines, or any traces of ice-action." He goes on to say that the ancient lake-basins near Omeo might suggest the action of ice.

Whilst these two authors do not believe in a glacial period having ever occurred in Australia, Professor Tate and Mr. Griffiths assert that there are such traces, but their observations are very vague, and it appears that these gentlemen as well as those mentioned above, had looked for glacier remains altogether in the wrong places.

Professor Tate (3) states that he found erratic boulders and striated rock surfaces on the beach near Adelaide. To look for glaciers one must go up the mountains not down to the sea.

The evidence collected by Professor Tate proves by no means that any glaciers had ever existed in Australia, and it is probable that the erratics found by him were deposited on the beach by ice bergs stranded there, which may have drifted to the South Coast of Australia, from the South Pole at the time when it was colder in the southern hemisphere than it is at present.

Mr. Griffith's (4) evidence is of a still more vague character; he finds a lot of gravel and clay, and concludes that this must have been formed by glacial action. Mr. Griffiths did not however, take the trouble to go up to the place where all this gravel and clay was said to have been brought down from, so that, as he himself states, his evidence is very unsatisfactory. He also tries to bring some other geological facts in connection with a glacial period. I however, perfectly agree with Hutton (1), that all the formations referred to by Mr. Griffiths, could just as well have been formed in another way, and I do not think it likely that Mr. Griffith's clays and gravels are of glacial origin.

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(1) *Tenison-Woods.* Physical structure and geology of Australia. Proceedings of the Linnean Society of New South Wales. Vol. VII., p. 382.

(2) *Howitt.* Geology of North Gippsland, Victoria. Quarterly Journal of the Geological Society of London. Vol. XXXV., p. 35.

(3) *Tate* Anniversary Address to the Royal Society of Transactions of the Royal Society of South Australia, 1878—1879.

(4) *Griffiths.* On the Evidences of a Glacial Epoch in Victoria during past miocene times. Royal Society of Victoria, 1882.

OWN OBSERVATION.

Every child in the European Alps knows that glaciers are formed on mountains and nowhere else. So if one wants to find glacial remains, of course up the mountains one must go. If the glaciers at any time since the land has attained its present shape, have extended so far as Tate and Griffiths assert, if the Omeo Lake has been scooped out by glacier ice which Howitt considers possible, how much clearer must the evidence of glaciers be then, in the heart of the mountains down the sides of which they must have extended and where they must have originated.

On the other hand, if no evidence of glacial action is found in the low lands, that is no reason why glaciers could not have been present on the slopes of the highest mountains.

It is quite evident from this, that the glacial traces must be looked for in the mountains first, and then, when the existence of traces of prehistoric glaciers there have been found, the investigation can be extended down to the low lands to ascertain how far the glacies reached. The gentlemen mentioned above never took the trouble to look for the glacial traces in the alpine valleys, so that of course no reliance whatever can be placed on their statements where negative, and even where positive, they will not be satisfactory.

On these grounds I undertook an expedition to the highest mountains in Australia, knowing that I could easily decide the question of pre-historic glaciation there.

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(1) *Hutton.* The Origin of the Fauna and Flora of New Zealand, part II., p. 16.

Between the sources of the Murray in the west and the sources of the Snowy River in the east, there lies an extensive plateau on an average about 5000 feet high and extending over about 160 square miles. This plateau extends N. and S. for about 22 miles, and has an average breadth of 8 miles. A mile to the east of the western margin of the plateau the main range is situated extending in the same direction as the plateau from N. to S. In that part of the main range lies the highest mountain in Australia which I mapped, measured, and ascended for the first time, 7256 feet high, Mount Townsend. In a western secondary range, a mile to the north of my highest peak, another mountain is situated, which has been frequently ascended and which is crowned by a stone cairn. This latter has the name Mount Kosciusco or Mueller's Peak, and is 7171 feet high. Round about on this plateau there are numerous hills over 7000 feet in height, and the flat extended bottoms of some of the valleys lie about 6000 feet high.

Even now we find small patches of snow lying on the south-eastern face of the ranges, the remnants of snow drifts all the year round in heights above 6500 feet. These snow patches are never found in "deep ravines" as Mr. T. Stirling (1) states. Snow patches such as those on Kosciusco only lie close to the exposed parts where the wind blows a great amount of snow together and stores it for the summer.

Where eternal snow is to be found even now there glaciers must have been at the time of the glacial period, if it ever existed. I found in reality, as I anticipated, most beautiful and indubitable traces of glacial action in these valleys, and I conclude from my observations that the glaciers of that, very recent, glacial period in Australia, covered a part of the plateau mentioned and extended over about 100 square miles.

The evidence of glacial action which I discovered were rôches montonnées, glacier polished rocks, in several places above 5800 feet. Wherever the rocks protrude from the face of a mountain to form a spur there particularly, but also at other places, one may expect to find these traces. The ice-stream moving down the valley presses with the greatest force against the *protruding* parts of the sides of the valleys on the way, against the spurs. Any rocks or small stones which may have been accidentally frozen into the ice, and which may be situated near the bottom, will, when hard and protruding, cut deep grooves in the rocks which they pass over slowly, with the immense pressure of the whole glacier behind them. In this way the protruding rocks will be polished down more and more. As soon as the glacier retreats these polished rocks will be left bare and exposed to the air.

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(1) *Stirling.* Remarks on the Flora of the Australian Alps, &c. Souther Science Record, January, 1885, p. 12.

In our case these rocks are granite without exception, and their surface withers very fast. The grooves and scratches soon become obliterated, but the shape of the extensive polished surface remains and indicates to an experienced eye immediately the action of moving ice.

Further proofs for the correctness of the supposition that we have to do with the effects of ice, are furnished by the relative position of joints and surface. The polishing goes on of course quite regardless of joints, and consequently in 99 cases out of a hundred, one will find the polished surface cutting the joints at varying angles, and not parallel to the direction of any one system of joints.

I have examined the direction, dip, &c., of joints in 12 of the rocks which I consider as glacier polished, and found in every case that the direction of the polished surface followed the direction of the valley, the direction in which the glacier there, once had moved, and was never parallel with any system of joints. The rounded, always convex shape, and particularly also one fact proves the glacial origin of these surfaces without a doubt—viz., that the polished surface is *continuous* for a long distance in some places. That is to say, in those parts numerous isolated rocks, in different parts of the hill side or spur, are polished down to exactly the same level.

One of these instances, on a spur high above a tributary to the Snowy River, was so remarkable, that my assistant, who had never seen any rôches moutonnées in his life before; was immediately very much struck by the appearance of it.

There, there is one rock polished off with a surface of about 3 acres and about 25 other much smaller ones around it, all polished down to exactly the same surface, divided from one another however by depressions of varying depth.

The most numerous and the best preserved of these rôches moutonnées are found in a valley, which I name after our President the Government Geologist, Wilkinson Valley. As I have studied this valley most minutely and as it is doubtless the highest valley in Australia, I shall describe it and also the glacier which at one time filled it.

On Plate 7 and 8, the Wilkinson Valley is represented, as seen from Mount Townsend, which I ascertained to be the highest peak in Australia. The Wilkinson Valley is enclosed by the Abbott Range and Müller's Peak in the north and north-west, by the Main Range for a mile on the east and by the Wilkinson Range on the south-east. Its main direction is from N.E., to S.W. For the upper three miles of its length its bottom is broad and flat and lies very high, forming part of the Kosciusco plateau, Then the fall which is only about three feet to the mile in the upper part rapidly increases and at the same time the valley becomes quite narrow so as to represent a steep ravine.

From the Abbott Range a broad spur descends in a southerly direction into the upper flat part of this valley and forces the stream in its bottom to curve round in the same direction.

On the sides of this valley but particularly on this spur rôches montonnées are very numerous and it is easy to see how far the glacier reached up the hill side by the extent of these glacier polished rocks.

In plate 7, this spur with the polished rocks is seen "en face" just opposite.

Plate 8, represents the probable shape and size of the glacier when it filled that valley. Of course I name the glacier after the valley which it helped to scoop out.

The picture is the same as plate 7, and I have drawn the glacier to that height, at which rôches moutonnées were observed by me. The other parts are of course drawn without regard to the denudation since then, and I have used my alpine experience in giving a picture of the distribution of rock and snow, as it would probably be in summer, were Australia now subjected to a glacial period.

To those who have not seen the glaciers in the high alps, the picture will convey a better idea of the character of the country at that time than any description.

The picture pretends to nothing but a hypothetical value, and will, I hope, be judged accordingly.

Conclusions.

On going to the place where glacier traces might have been expected, these were found in the shape of rôches moutonnées, scattered over an area of about 100 square miles on a plateau above 5,800 feet.

That part of Australia was therefore not so long ago certainly covered by ice.

The question arises whether the glaciers did not extend further down than that. I have looked carefully around on my way up and down the mountain, but I was not able to detect any trace of glacial action below 5,800 feet. In the Snowy Valley a glacier might be expected to have descended for some distance from the mountains, and I think it very likely that moraines will eventually be found there. This valley is, however, the only one in which moraines may be expected, because it is the only one which comes down from an extensive plateau on which a glacier was formed.

It is difficult to fix the time of the glacial period, but it is evident that it was in all probability simultaneous with the glacial period in New Zealand.

According to von Haast (1) the glaciers there descended at that time into the sea on one side and down to a height of a few hundred feet on the other. In New Zealand there are high mountains on the slopes of which the glaciers were formed, and New Zealand also lies further south than Mount Kosciusco. Further there is no doubt that there were warm dry winds from the interior of Australia blowing over the Kosciusco plateau at the time of the glacial period as they do now, winds which must have diminished the size of the nevées very considerably.

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(1) *Von Haast.* Geology of Canterbury and Westland.

Taking all this into consideration we must come to the conclusion that the glaciers of the glacial period in Australia need not have been very extensive, even if nearly the whole of the middle Island of New Zealand were covered by eternal ice at the time.

Hutton (1) is not inclined to believe that the glacial period in New Zealand was so severe as is generally believed, in consequence of the great abundance of animal life at that time. I must say that I do not see this at all. Chamois and many other mammals, as well as birds, live always high above the glacial terminations in summer and winter in Europe, so that there is no reason to suppose that there should not have been an abundance of animal life even if the glaciers had extended further than von Haast (2) states. Hutton (l.c.), is quite right when he says, that if the glaciers in Australia had had that extent which Griffiths supposed, that then the climate in the South Island of New Zealand (I suppose the Middle Island is meant), would have been polar.

This certainly was not the case, as the fossil fauna shows, and therefore, the simultaneous glacial period in Australia could not have been very severe as Hutton very ingeniously concludes.

My own observations tend to prove the correctness of his statements, and the extent of glaciers in the glacial period of Australia according to my observations, is quite in accordance with the much greater extent of glaciers in New Zealand.

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(1) *Hutton.* The Origin of the Fauna and Flora of New Zealand. Par II., p. 16.

(2) *Von Haast.* Geology of Canterbury and Westland.

The state of preservation of the rôches moutannées in the Australian Alps, is nothing like so good as in the New Zealand Alps. I am, however, not inclined to ascribe that to a difference in age. I consider it simply as a consequence of the difference in the rocks; there hard metamorphised slates, here granite.

The difference between diurnal and nocturnal temperature will doubtless also be much greater on Kosciusco, with a continental climate, and nearer the equator, than in New Zealand where an island climate prevails, and where the sun is never so hot in the day time.

I have in another paper (1) drawn attention to the immense amount of weathering caused by differences of temperature, and I think that the rocks on Kosciusco are accordingly exposed to a much more energetic processs of weathering than those in New Zealand.

These differences I think suffice to explain the difference of preservation of the polished rocks in Australia and New Zealand, and I believe I am therefore justified in considering the glacial period of Australia and that of New Zealand to be isochrone.

In another paper (2) I have tried to show that this latter was very recent, and we should in that case have to assume that also the Australian glacial period had occurred at a relatively recent date.

RESULT.

1. At the time of the glaciation of the Southern Hemisphere, Australia was subjected to a glacial period as well as New Zealand.

2. The climate was then not very cold so that the glaciers only covered the highest part of the Australian Alps, and were consequently very small.

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(1) *Von Lendenfeld.* Der Tasman Gletscher und seine Umgebung. Ergänzüngsheft, Nr. 75 zu Petermanns geografischen Mittheilungen. Seite 42.

(2) *Von Lendenfeld.* The time of the glacial period in New Zealand. Proceedings of the Linnean Society of New South Wales. Vol. IX., p. 806.

3. One glacier system has been discovered on the highest part of the Australian Alps. The glaciers extended from a high plateau—Mount Kosciusco—down into the valleys around. The glacial area may be estimated at at least 100 square miles. There were small glaciers at the source of the Murray, not extending far down the plateau, there was a small glacier at the head of the Crackenback. The largest glacier filled the valleys at the sources of the Snowy River and probably extended for some distance down the Snowy Valley.

4. As even on the highest elevation the glaciers were so small it is not likely that glaciers existed anywhere else in Australia at the time.

5. The glacial period in Australia was probably isochrone with a pluviatile period, when the rivers were large and when there was a dense vegetation in many parts of the country which now are barren, and which was sufficient to feed the gigantic Diprotodon and other fossil marsupials.

EXPLANATION OF PLATES.

Plate 7.—Muller's and Abbott Peak and Wilkinson Valley from Mount Townsend from a sketch taken by the Author on 11th January, 1885.

Plate 8.—The same as it would appear in the glacial period.

THE PROTEACEÆ OF AUSTRALIA.

By Rev. W. Woolls, Ph.D., F.L.S.

The late William Forster, M.P., in his paper on "*Australian Autochthony*," published in the *Sydney University Review* (1882), when referring to the *Proteaceæ* remarks:—"The *Proteaceæ* constitute in themselves, as it were, a microcosm of orders, comprising a number of sub-divisions, each of which seems, as if, under favourable circumstances, it might have developed into a separate order, and which, by agreeing to differ, strike one at first sight as if they had been classified, not so much by their resemblances to, or affinities with each other, as by their differences or divergences from other groups, though doubtless a close, and more strict comparison reveals essential affinities." A casual observer might naturally adopt this view of the order; but, though the species differ widely from each other in appearance, and suggest alliances with other orders, there is in reality a bond of union which separates them from the rest of the vegetable kingdom and binds them closely together. The name of the order is, indeed, highly appropriate, for the species are *protean* in their character, ranging from mere herbs to large trees, exhibiting an inflorescence differing very much in colour and arrangement, and occurring from the immediate vicinity of the sea-coast to the summits of mountains. According to the eminent R. Brown, the *Proteaceæ* have the radicle always pointing towards the base of the fruit, this distinguishing it from the orders nearly allied, such for instance as the *Thymelaceæ* and *Lauraceæ*, which have the radicle short and superior. But independently of this mark of difference, the order is easily recognized by the harsh, woody texture of the leaves, the irregular tubular calyxes with a valvate æstivation, the position of the four stamens on the divisions of the calyx, the bursting of the anthers longitudinally, and the erect disposition of the ovules. The characters of the species are in some genera so well defined, that even in a fossilised state they may be referred to their appropriate places in the vegetable kingdom. Sir J. D. Hooker in his essay on the Flora of Australia (1859) states that "in the Bagshot sands some silicified wood has been found, which may confidently be referred to *Banksia*, and which is in fact scarcely distinguishable from recent and fossil *Banksia* wood;" and he further adds "Wesel and Weber describe from the brown coal of the Rhine a rich and varied Flora, representing, &c., &c., &c., some of the peculiar and characteristic genera of the Australian, South African, American, Indian, and European Floras." A more recent writer affirms that all the family of the Proteaceæ, comprehending *Banksia*, *Hakea*, *Grevillea*, existed in Europe during the tertiary period, and that some of the fruits bear a marked resemblance to certain species now found in Australia. At the present period of the world's history the geographical distribution of the order is somewhat perplexing, for whilst the species are most abundant in Australia and South Africa, extending on the one hand to New Caledonia, the Indian Archipelago, and tropical Asia and Japan, and on the other to the Andes of South America—none of the Australian and African species are identical, nor do any of those with indehiscent fruit extend to America or Asia. Whilst, therefore, the species described in the *Flora Australiensis* are strictly indigenous, the relation to the African Flora is simply tribual or generic, so that Mr. Bentham, speaking in general terms without any reference to the Flora of other geological periods, was of opinion that "the great mass of purely Australian species and endemic genera must have originated or been differentiated in Australia, and never have spread for out of it."

Now that, through the labours of Mr. Bentham and Baron Mueller, we are enabled to take a general view of the *Proteaceæ* in Australia, it appears that the known species of the order in this continent amount to nearly 600, and that about two-thirds of that number are found in Western Australia. The genera peculiar to that colony are *Simsia*, *Synaphea*, *Franklandia* and *Dryandra*; whilst of *Adenanthos*, *A. sericeus* occurs in South Australia, and *A. terminalis* in South Australia and Victoria, and of *Lambertia*, *L formosa* in New South Wales.

The western genera and species are thus arranged in Baron Mueller's census.

1. *Petrophila*	33	species.
2. *Isopogon*	25	
3. *Adenanthos*	14	
4. *Simsia*	5	
5. *Synaphea*	8	
6. *Conospermum*	26	
7. *Franklandia*	2	
8. *Persoonia*	24	
9. *Xylomelum*	2	
10. *Lambertia*	8	
11. *Strangea*	1	
12. *Grevillea*	90	
13. *Hakea*	68	
14. *Banksia*	36	
15. *Dryandra*	47	
	389	

Next to West Australia, N. S. Wales has the greatest number of species, but as will be seen by the subjoined list, some of the genera are but poorly represented, though the Waratah (*Telopea speciosissima*), regarded by some as the finest of Australian flowers, is peculiar to this colony :—

Petrophila	3	species.
Isopogon	4	
Conospermum	7	
Symphyonema	2	
Persoonia	32	
Macadamia	1	
Helicia	4	
Xylomelum	1	
Lambertia	1	
Orites	1	
Strangea	1	
Grevillea	39	
Hakea	14	
Stenocarpus	2	
Lomatia	3	
Telopea	1	
Banksia	8	
	124	

Thus it appears, that in N. S. Wales the species are not one third of those in W. Australia, whilst Queensland, Victoria, S. Australia, N. Australia and Tasmania have respectively, so far as yet known—59, 51, 33, 33 and 23. *Banksia*, *Hakea*, and *Grevillea* are common to all Australian Colonies and Tasmania, whilst the first has been found on S.E. of New Guinea (F. v. M., Papuan Plants, p. 18.) *Dryandra*, which differs from *Banksia* principally in having an involucre of numerous bracts, is exclusively a western genus, and so remarkable for the uniformity of its flowers, that Mr. Bentham found it difficult to establish any definite sections. No species of this genus has travelled accidentally out of its peculiar region. *Symphyonema*, in its two species of *S. montanum* and *S. paludosum*, has not been found beyond the limits of New South Wales, whilst *Bellendena*, *Agastachys* and *Cenarrhenes*, each represented by a single species, are peculiar to Tasmania. *Hakea cycloptera* seems limited to a small area in South Australia, but *H. multilineata* which is beautifully figured amongst Brown's "*Forest Plants of South Australia*," and was supposed to have migrated as a solitary species from the west, has recently been met with in the north (F. v. M.) There is something remarkable in the distribution of the *Proteaceæ* in Australia. Allan Cunningham who accompanied the late Admiral King in his survey of the north-western coasts of the continent, was of opinion that in that region the order was limited to *Grevillea*, *Hakea* and *Persoonia*, and, further, that *Banksia* was not represented there. He says :—"Viewing the general distribution of *Banksia* it is a singular fact in the geographical distribution of this genus, that its species, which have been traced through almost every meridian of the south coast, upon the Islands of Bass's Strait, in Van Diemen's Land, and widely scattered throughout the whole extent of New South Wales to the south coast, at which extreme of the continent *B. dentata* has been observed as far west as longitude 130° east, should be wholly wanting as the north-west coast." He then adds "Our limited knowledge of the west coast (properly so called) does not afford us materials to hazard even a particular conclusion relative to the existence of this family on its shores, excepting that, from the total absence of any one plant of *Proteaceæ* at those parts of Rottnest and Dirk Hartog's Islands visited during the Bathurst's voyage, an inference may be drawn of the general paucity of any part of the order on the shores of the neighbouring main." Since the days of CUNNINGHAM, who, amidst many discouragements and disappointments, did so much to promote the knowledge of Australian vegetation, our views have been somewhat modified as to the distribution of the *Proteaceæ* and the genera prevalent in particular regions. Baron Mueller, when in company with A. C. Gregory, in 1856, illustrated the Flora of Arnheim's land by the record of some 800 species of plants, amongst which he mentions 45 species of *Proteaceæ*, including *Conospermum* (1), *Helicia* (1), *Persoonia* (5), *Orites* (1), *Grevillea* (22), *Hakea* (7), *Lomatia* (1), *Stenocarpus* (2), and *Banksia* (5). *Banksia Dentata* he found at the mouth of the Victoria river, whilst he saw specimens of the same species from the promontory Escape Cliffs. (Frag., Vol. 7, p. 57.) In the *Flora Australiensis*, Vol. 5, p. 555, it is also recorded from the Glenelg River (125° E.) The only Proteaceons plants collected at Nickol Bay and the Murchison River, by Mr. Pemberton Walcott and Mr. Maitland Brown in 1861, were *Hakea lorea* (R. Br.) and *Grevillea Wickhami* (Meissn.), but several species of *Banksia (B. sphærocarpa, B. Menziesii, and B. Lindleyana)* are known from the latter locality. In the recent list of Western Australian Plants, 1883, collected by the Hon. John Forrest, at Shark's Bay and its vicinity, *Banksia* is not enumerated, but the following species appear to be indigenous there, as specimens of them were seen and examined by Baron Mueller :—

Conospermum Stæchadis, Endl.
Grevillea pterosperma (F. v. M.)
stenobotrya (F. v. M.)
chrysodendron (R. Br.)
annulifera (F. v. M.)
leucopteris (Meissn.)
striata (R. Br.)
deflexa (F. v. M.)
Hakea Cunninghami (R. Br.)

Professor Lindley (Vegetable Kingdom, p. 533), characterises the Proteaceæ as one of the most useless orders to man. But this opinion must be modified, as well as that which regards the geographical distribution of its species, for whilst many of them play an important part in the economy of nature—growing in sandy, sterile, and exposed places where other plants could not exist, and preparing the way for a higher order of vegetation, some of the species are now utilised for the value of their timber, the industrial properties of their barks, the various products extracted from them by distillation, and the fruits, which may probably be improved by cultivation. Amongst the woods prepared by the late Sir W. Macarthur for the Paris Universal Exhibition, 1867, those of the following trees are enumerated with greater or less commendation :—

Stenocarpus salignus.
Xylomelum pyriforme.
Banksia serrata.
integrifolia.
Grevillea robusta.
Persoonia linearis.
latifolia.

Mr. Moore, F.L.S., also mentions from the northern districts, in addition to several of those recorded by Sir William :—

Orites excelsa.
Helicia glabriflora.
H. prœalta.
H. ternifolia. (Macadamia.)
Stenocarpus Cunninghami

In Queensland several species of *Grevillea*, *Banksia* and *Stenocarpus*, are likewise valued for their woods. According to the documents relating to the International Exhibition (1866-67), it is shown that the per centage of tar and the strength of the wood vinegar from some of the *Proteaceæ* bear fair comparison with the results attained in other countries from other trees.

Banksia Australis is especially instanced in yielding as 100 parts of its wood, 29·5 of charcoal, 40·062 of crude wood vinegar, 6·562 of tar, and 23·876 of uncondensible gases, while *Banksia serrata* gave 10·8 per cent of tannic acid. The drupaceous fruits of the *Proteaceæ* are for the most part small and insipid, but *Macadamia ternifolia*, or the Queensland nut, bears an edible nut of excellent flavour, whilst the flowers of *Banksia ornata*, *Lambertia formosa*, and some other species are rich in melligenous sap.

ON A NEW SNAKE FROM THE BARRIER RANGES.

By William Macleay, F.L.S., &c.

Among a small collection of reptiles made at Milparinka by Mr Charles Macarthur King, P.M., and presented by him to the Australian Museum, I find an undescribed species of the genus *Furina*. Two species have been previously described. *Furina bimaculata*, Dum. and Bibr., an inhabitant of Western Australia, and *Furina bicucullata*, M'Coy, found in the colony of Victoria.

The present species I propose to name after the distinguished Curator of the Australian Museum, E. P. Ramsay, F.R.S.E., &c.

Furina Ramsayi.

Scales in	17 rows.
Ventral plates	162
Sub-caudals	38/38
Anal plate	bifid.
Total length	15 inches.
Tail	2½ inches.

Colour reddish yellow on the back, whitish yellow beneath. The upper surface of the head and a broad band behind the head, black, the muzzle and a broad collar on the back of the head, white. Four, or in some cases five narrow black bands or rings, not extending to the ventral plates, cross the body at almost regular intervals; the last at the junction of the tail; the tip of the tail is also black.

The head plates are like those of *F. cucullata*, but the rostral shield seems to be more triangularly rounded between the anterior frontals, and the vertical is almost quite truncate in front; the anterior ocular and the nasal at their junction completely separate the posterior frontal and second labial.

The three species of the genus *Furina* have a strong general resemblance, particularly in the colouration of the head, but they differ in other respects as widely as in their distribution. Thus in *F. bimaculata* the scales are in 15 rows, the belly plates are 200, and the sub-caudals 21/21, while in *F. bicucullata* the scales are as in the present species in 17 rows; the ventral plates vary from 180 to 220, and the sub-caudals are in 64 or 66 pairs, differing widely from *F. Ramsayi*, where they are respectively 162 and 38/38. The markings on the body also seem distinct and constant in each.

There are three specimens in the collection, of different sizes, but all marked alike. The dimensions given above are from the largest specimen. The other Reptilia from Mount Brown received at the same time were a specimen of *Vermicella annulata*, the rare *Delma Fraseri*, a species of *Typhlops* doubtful.

NOTES AND EXHIBITS.

Mr. Whitelegge exhibited a large collection of fossil ferns from the Hawkesbury and Wianamatta beds, mounted as transparent objects for the microscope. It is remarkable that the tissues of these plants have remained almost unaltered and perfectly elastic and pliant through the vast periods during which they have been preserved.

Mr. Tenison-Woods exhibited two very small stone axes, or "kelts," from the Murrumbidgee, supposed to have been used for ceremonial purposes; a canoe ornament from Florida, Solomon Islands; a wooden figure of a mammal (Cuscus?) from the Louisiade Archipelago; and several fine stone axes from New Guinea, the Louisiades, Solomon Islands, New Zealand, and Australia.

The President exhibited some of the "pug," or mixed clay and wash-dirt which is being worked in the Caledonian claim, near Gulgong. This material is found filling up the ancient caverns and tunnels of a mass of crystalline Devonian (?) limestone, excavated under conditions of rainfall and drainage totally different from those now existing. It contains large quantities of iron and manganese in small grains, and also in lumps of considerable size. The gold is said to be coarse, or nuggetty.

He also exhibited specimens of *Macadamia ternifolia*, or Queensland nut, in illustration of Dr. Woolls' paper.

WEDNESDAY, 25TH FEBRUARY, 1885

The President, Professor W. J. Stephens, M.A., F.G.S., in the Chair.

VISITORS PRESENT.

Mr. W. G. Harrison, Dr. Coppinger, Mr. Sydney Olliff, Mr. Ogilby.

MEMBERS ELECTED.

Mr. Ogilby, Australian Museum, Dr. Coppinger, H.M.S. Nelson.

DONATIONS.

"Abhandlungen von der Senckenbergischen Naturforschenden Gesellschaft." 13th Band, Heft IV. From the Society.

"Les espèces Françaises du Genre Philoscia, Latreille, 1884." From the Author, Mons. Adrien Dollfus.

"Journal of the Royal Microscopical Society." Series II., Vol. IV., Part 6. December 1884. From the Society.

"Feuille des jeunes Naturalistes." No. 171, 1st January 1885. From the Editor.

"Victorian Naturalist," Vol. I., No. 13, January, 1885. From the Field Naturalists' Club of Victoria.

"Zoologischer Anzeiger," Jahrg. VII., No. 184 ; Jahrg. VIII., No. 185, 29th December, 1884, and 12th January, 1885. From the Editor.

"Abstract of Proceedings of the Royal Society of Tasmania," January 26th, 1885. From the Society.

"Proceedings of the Academy of Natural Sciences of Philadelphia," Part II., May to October, 1884. From the Editor.

"Mittheilungen aus der Zoologischen Station zu Neapel." Fünfter Band, III. and IV. Heft. From the Director.

"Monatliche Mittheilungen des Naturwissenschaftlichen Vereins des Regierungsbezirkes Frankfurt." Jahrg. II., Nos. 8 and 9. November and December, 1884. From the Society.

PAPARS READ.

ON SOME *REPTILIA* LATELY RECEIVED FROM THE HERBERT RIVER DISTRICT, QUEENSLAND.

By William Macleay, F.L.S., &c.

I have frequently, within the last two years, received from my friend, Mr. J. A. Boyd, of Ripple Creek, Ingham, collections of Mammals, Reptiles, and Fishes made in the vicinity of the Herbert River ; and I have, I believe, more than once, expressed my surprise at the wonderful richness of the Fauna of that district of Northern Queensland. I have now to record the receipt from the same district and the same gentleman, of two drums of spirit specimens, the contents of which fully bear out the reputation of the district for the abundance of its animal life. The Mammals and Fishes of the collection I shall probably have something to say about on another occasion. I shall at present confine myself to some notices of the Lizards and Snakes, with which the district seems to abound.

Class. REPTILIA.

Order. SAURIA.

Family. SCINCIDÆ.

HINULIA PICTA. n. sp.

Rostral shield large, very obtusely angled at its contact with the præfrontal. Nasal shields small, distant. Præfrontal large, rounded in front, and truncate behind with the exception of a small lobe in the middle. Postfrontals pentagonal, in contact with the præfrontal on their anterior face, and with the vertical behind. The vertical is four-sided, the anterior faces forming a short triangle, the posterior a long one. At the base and on each side of the apex of the vertical, are two rather small occipital shields, and behind these three larger ones, the middle of these being narrower than the others. The orifice of the ear is round and smooth The general colour is a pale lavender grey, slightly darker on the back and tail than on the belly; the scales are uniformly smooth and glossy. On the head and neck are numerous black and brown marks which appear to take the following order:—An ill-defined black band encircles the nose and muzzle; another, broad and composed of two black streaks with the intervening space brownish, extends from beneath the eye across the throat, where it is connected with the first band; the third of the same double character, extends from the ear across the throat; immediately behind this a very broad band extends across the nape, the hinder portion of it forming a distinct double black band extending to the fore legs. Behind this the body is marked by 12 equidistant, narrow, undulating, parallel, black, more or less white edged, bands not extending on the belly. The tail is similarly marked, but the bands are straight.

One specimen. Length, 8 inches.

This is a very beautiful species. The disposition of the head shields differs considerably from that of most if not all the species of this very numerous Australian genus, excepting perhaps *Hinulia Gerrardi*

TETRADACTYLUS GUTTULATUS. n. sp.

Entirely of a nitid bronzy brown paler on the belly, every scale with one or more very minute black spots, a few palish marks on and about the labial shield. The nasal shields are widely separated by the frontal, behind the frontal lies the vertical, which is in form of a triangle with rounded apex, behind it there are two pentagonal occipital shields and behind these are three others larger, the middle one triangular and enclosed between the two lateral shields. There is a deep longitudinal impression from the mouth to the eye along the summit of the first three labial shields. The ear orifice is round and open. The legs are weak and distant as in the genus, and the tail is very elongate. Length, 6 inches.

One specimen only.

Order. OPHIDIA.

Family. BOIDÆ.

NARDOA CRASSA. n. sp.

Scales in...........................	42 rows
Abdominal Plates	280
Anal Plate.........................	undivided
Sub-caudal Plates	52/52
Total length	68 inches
Tail	7 inches
Head..............................	2 inches
Girth of body	7 inches.

The body of this snake is thick and cylindrical, the tail short, thick and tapering to a blunt point; the head is narrow and elongate for the family. The rostral shield is broad and low; the anterior frontals are oblong; the posterior frontals are very long, (in *Nardoa Gilberti* there are two pair), the vertical is nearly as broad as long and polygonal; the first upper labial shield, and the four posterior lower labials are pitted. The eye is rather small and comes in contact with the sixth and seventh upper labial shields.

The upper surface of the head and body and the tail is of a brownish black, the side scales becoming paler towards the belly, which is yellowish white. The abdominal plates are little more than twice the widths of the body scales nearest them, which grow rapidly narrower towards the back. The labial shields are yellowish.

I received from Mr. Boyd three specimens of this powerful snake, and the above description is taken from the largest of the three.

The genus *Nardoa* was originally created by Gray in 1842, for the reception of two Snakes, one which he named *Gilberti*, from Port Essington, the other *Schlegelii*, from New Ireland. The first of these has since been got from Port Denison and Port Darwin, but I am not aware that the New Ireland species has ever been taken again.

The present is a very distinct well marked species. The genus will very probably be found in New Guinea.

TROPIDONOTUS ATER. n. sp.

Scales in	14 rows
Abdominal Plates	147
Anal Plate	bifid
Sub-caudal Plates	64/64
Total length	30 inches
Tail	5½ inches

This a handsome active looking Snake. The head and head-shields exactly correspond with those of *T. picturatus*, but the body is of slighter make, and the tail is very fine and tapering. The colour is jet black on the entire upper surface; the abdominal and sub-caudal plates are of a pinkish-white with a dark band on the base of each plate, giving much the appearance of the marking on the belly of the Black Snake—*Pseudechis porphyriacus.* Three species of *Tropidonotus* are now known to inhabit Australia, two of these *T. angusticeps* and the present species *T. ater* have been described by me from specimens taken at the Herbert River, and the third species *T. picturatus* I have also seen from that district.

HOPLOCEPHALUS ASSIMILIS. n. sp.

Some months ago I received from Mr. Boyd a species of *Hoplocephalus* which, with some hesitation, I referred to the Sydney species *Hoplocephalus nigrescens*, Gunth. I received from Mr. Boyd on this last occasion, two other specimens of the same snake, and I am thereby enabled to pronounce positively that the Sydney and Herbert River specimens belong to different species. I propose the name given above for the Herbert River species.

Scales in..........................	15 rows
Abdominal Plates	192
Anal Plate	single
Sub-caudal Plates	37
Total length	17 inches
Tail................................	2½ inches.

The head shields are almost identical with those of *H. nigrescens*, excepting that the anterior frontals are shorter, being less than half the length of the posterior, and the loreal space is taken up by the nasal and anterior ocular shields, completely separating the second labial and posterior frontal. The superciliaries are only half the length of the vertical, which is broad, six sided, and triangular behind. The eyes are very small, and the post-orbitals vary in number from 1 to 3. The tongue is not white as in *H. nigrescens*. The colour is black above, beneath it varies from a pinkish colour in some specimens, to an almost leaden gray colour in others.

NOTES ON CERTAIN CEYLONESE COLEOPTERA (CLAVICORNIA) DESCRIBED BY THE LATE MR. FRANCIS WALKER.

By A. Sidney Olliff, Assistant Zoologist,
Australian Museum.

A few months ago, whilst going through the collection of Clavicorn Coleoptera in the British Museum, I had occasion to examine the types of some species from Ceylon, described by the late Mr. Francis Walker. As many of these species were referred to genera widely remote from those to which they naturally belong, and are consequently out of place in Gemminger and von Harold's general catalogue of Coleoptera, I thought a few notes which I made at the time would not be without interest to the members of this Society, especially as two of the species are very nearly allied to some of the commonest Clavicorns of this country.

One or two of the following synonyms, distinguished by an asterisk and included here for the sake of completeness, have already been published by Mr. C. O. Waterhouse, who has also pointed out that *Inclica solida*, described by Walker as a new genus of Byrrhidæ, belongs to the Cryptocephalidæ, at the same time suggesting that it may prove to be identical with *Monachus*.

Nitidulidæ.

Nitidula contegens, Walk., Ann. Mag. Nat. Hist. (3), Vol. II., p. 206 (1858).=*Carpophilus vittiger*, Murray, Trans. Linn. Soc., Lond., Vol. XXIV., p. 373 (1864).=*Carpophilus biguttatus*, Mostch., Etudes Ent., 1858, p. 43.

I think the latter name should have precedence, as Walker's description applies almost equally well to any of the spotted species contained in the ninth section of Murray's sub-genus *Carpophilus*.

NITIDULA INTENDENS, Walk., *loc. cit.*=*Haptoncus pubescens*, Murray, Trans. Linn. Soc., Lond., Vol. XXIV., p. 403 (1864).

Walker's type is a small stained example.

NITIDULA SIGNIFICANS, Walk., *loc. cit.*=*Haptoncus tetragonus*, Murray, Trans. Linn. Soc., Lond., Vol. XXIV., p. 401, pl. 33, fig. 7 (1864).

NITIDULA ? TOMENTIFERA, Walk, *loc. cit.*=*Aethriostoma undulata*, Motsch, Etudes Ent., 1858, p. 47, pl. 1, fig. 10.

The true position of this insect is in the family Dermestidæ as indicated by Motschulsky.

NITIDULOPSIS ÆQUALIS, Walk, *loc. cit.*=*Brachypeplus omalinus*, Murray, Trans. Linn. Soc. Lond., Vol. XXIV., p. 299, pl. 34, fig. 7 (1864).

A typical *Brachypeplus*. The only character given to distinguish the genus *Nitidulopsis* is common to almost all the species of this section of the family

RHYZOPHAGUS PARALLELUS, Walk, *loc. cit.*=*Nausibius dentatus* Marsh, Ent. Brit., p. 108, (1802).

This should, of course, be referred to the *Cucujidæ.*

NITIDULA SUBMACULATA, Walk, *op. cit.*, Vol. III., p. 52, (1859) =*Epurea.* n. sp.

MELIGETHES RESPONDENS, Walk, *loc. cit.* p. 53.=*Idæthina (Macroura) nigritula*, Reitter, Verh. Ver. Brünn, Vol. XII., p. 82, (1874).

I have already pointed out (Notes Leyden Mus. VI., p. 74) that *Idæthina* and *Macroura* are synonymous and that the latter name is preoccupied. Walker's insect is closely allied to *I. brunnescens*, Reitter, which occurs in the neighbourhood of Sydney.

The two species *Tritoma bifascies* and *Chilocorus opponens*, described by Walker as belonging to the *Diaperidæ* and *Coccinellidæ* respectively, are varieties of the same species and must be referred to this family. The synonmy is as follows :—

CAMPTODES BIFASCIES.

Tritoma bifascies, Walk, Ann. Mag. Nat. Hist., (3) III., p. 259, (1859).

Chilocorus opponens, Walk. loc. cit. IV., p. 219, (1859). (1)

Camptodes ornatus, Motsch. Bull. Soc. Mosc., II., p. 442 (1863.)

Hemirophalon notatum, Murray *in litt.*

TROGOSITIDÆ.

TROGOSITA INSINUANS, Walk, Ann. Mag. Nat. Hist., (3) II., p. 206, (1858).=*Tenebrioides insinuans.*

TROGOSITA RHYZOPHAGOIDES, Walk, loc. cit., III., p. 53, (1859).

This species must form the type of a new genus for which I would propose the name *Asana*. It has all the essential characters of *Lipaspis*, Wollaston, but is at once distinguished by the presence of a distinct scutellum.

CUCUJIDÆ.

SILVANUS RETRAHENS, Walk, Ann. Mag. Nat. Hist., (3) II., p. 207, (1858).=*Lyctus*, sp.

CUCUJUS? INCOMMODUS, Walk., *loc. cit.*, Vol. III., p. 53 (1859).= *Telephanus cruciger*, Waterhouse, Ent. Mo. Mag., Vol. XIII., p. 124.=*Psammœcus breviusculus*, Reitter, Verh. z—b. Wien, Vol. XVII., p. 178 (1877).=*Psammœcus trimaculatus*, Motsch. Etudes. Ent., 1858, p. 45.

The markings on the elytra of this insect vary considerably. In typical specimens the transverse fascia is very distinct but in others it is almost effaced.

* PROGNATHA DECISA, Walk., *loc. cit.*. Vol. II., p. 205 (1858).= *Inopeplus lateralis*, Motsch., Etudes Ent., 1859, p. 97. *Cf.*, Waterhouse, Trans. Ent. Soc., Lond., 1876, p. 14.

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(1) *cf.* Von Harold, Col. Hefte XIV., p. 211, and Reitter, Verh. z—b, Wien XXIV., p. 510.

The type of this species, which Walker placed in the genus *Prognatha* of the family Staphylinidæ, is in good preservation, and perfectly agrees with specimens of *I. lateralis* received from Motschulsky, by the late Mr. Andrew Murray.

LATHRIDIIDÆ.

* MONOTOMA CONCINNULA, Walk., Ann. Mag. Nat. Hist. (3), Vol. II., p. 207 (1858).=*Cryptamorpha fasciata*, Wollaston, Ent. Mo. Mag., Vol. X., p. 169 (1874). *Cf.*, Waterhouse, Ent. Mo. Mag., Vol. XIII., p. 122.

This species should be referred to the preceding family.

DERMESTIDÆ.

ATTAGENUS DEFECTUS, Walk., Ann. Mag. Nat. Hist. (3), Vol. II., p. 207.=*Trogoderma defectum*, Olliff, Trans. Ent. Soc., Lond., 1883, p. 185.

I think it very probable that this species will be found in New South Wales. It is caught among feathers, hides, &c., and has already been received from Ceylon, N. E. Borneo, and Java.

ON FLIGHT.

By R. von Lendenfeld, Ph.D.

The locomotion of animals has been the topic of an ever increasing number of papers since Marey published his unparalleled book (1) on this subject. Of all the different modes of locomotion none is so interesting as flight, because the organs adapted for this function are much more highly developed than any other locomotive organs.

In studying this subject one would naturally assume that the size of the wings was in proportion to the weight of the body, and that an animal would fly the better, the larger the relative size of the wings. It has however, been shown by myself and others, that this is by no means the case, and that an insect the relative size of whose wings is equal to the relative size of the wings of a swallow, cannot fly (grasshoppers, Dytiscus, &c.)

I have explained this fact by asserting that the very short wings of small animals would require a rapidity of motion, to have the same effect as the long wings of large animals, which is altogether incompatible with the celerity of the muscular contractions, and which has not been observed by Marey, who measured the number of wing-flaps per minute, nor by myself, who measured the extent of the angle which is passed through by the moving wing. I have previously asserted that the resistance of the air to flight was equal to C^3 that is the cube of the rapidity. The rapidity in itself is of course a factor depending not only on the rapidity of the wing-flaps and their angles, but also on the length of the wing increasing in proportion to the latter.

All these statements have been laid down in an essay published some years ago by me (2.)

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(1) *Marey.* Locomotion animale, International Scientific Series.

(2) *V. Lendenfeld.* Der Flug der Libellen Sitzungsberichte der Kais. Academie der Wissenschaften in Wien. Band 81.

Several writers have since then dwelt on the subject of flight. Of these the careful essay of Müllenhoff (1) requires our especial attention.

Although Müllenoff dwells on his dissent from my views extensively, he acknowledges the correctness of my deduction referred to above, by stating that the correlation between the rapidity of wing-flaps and weight of the body can be expressed by asserting that the "centre of resistance" always moves with nearly the same velocity.

Among his numerous valuable statements, I will particularly refer to his ingenious, and doubtlessly to a great extent correct explanation of the mode in which eagles and vultures can rise by describing circles in the air without the movement of their wings. His explanation is the following:—He says the bird moves with the wind, with his head turned to the direction to which the wind blows *downward*, and moves in the opposite direction with his head facing the wind *upward*. The force which enables the bird to rise higher when he is moving against the wind than he has sunk when he was moving with the wind, is derived from the feathers being raised from the body when the bird moves with the wind, when the wind comes from behind, and that these feathers lie close to the body, so that it presents a much smaller surface when the bird moves against the wind. At the same time Müllenhoff asserts that the bird moves with the wind, describing a screw-line, following the surface of an inclined cylinder, in the direction of the wind. I think that this explanation is a most ingenious one, but I would at the same time like to submit, that it appears highly probable that the bird moves its wings at the same time round the axis of the forearm in such a manner as to catch the wind on the *lower* surface which ever way it moves. I have very often observed, through a telescope, eagles and hawks rising in a slight breeze, and believe that these birds change the position of wings and tail as they move round and round in such a manner that the wind *always tends to force the bird upwards*, and that the bird never sinks at all. Of course the bird is carried faster along with the wind the quicker it rises.

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(1) *Müllenhoff.* Die Grösse der Flugflächen Pflügers Archiv für die Gesammte Physiologie. Band XXXV

NOTES AND EXHIBITS.

Mr. C. S. Wilkinson exhibited some Fossil Bones which had been recently obtained from the coral sand rock on Lord Howe Island. Amongst them was an almost complete skull somewhat resembling that of the Horned Lizard *Megalania prisca*, from the Pleistocene deposits on the Darling Downs, Queensland.

Mr. Wilkinson also exhibited specimens of Shells of oysters found in the beds of clay and sand at a depth of 40 feet below the surface, in sinking the new shaft of the Bullock Island and Wickham Coal Company near Newcastle. Mr. Brazier identified this oyster, which must have been 12 inches in length, as a large form of the *Ostræa edulis*.

Dr. J. C. Cox exhibited other specimens of the *Ostræa edulis* from Port Jackson, found firmly attached to a bottle. He pointed out the great difference between this oyster, which will not keep for more than a day, and the English native oyster, and suggested that they are of separate species. Mr. E. P. Ramsay mentioned that the same oyster in South Australia keeps well for many days, and was of opinion that they were the same as the *O. edulis* of England.

Mr. Ramsay exhibited a Fossil phalanx of *Palæorchestes*, from Wellington Caves, from the size of which he calculated that the animal must have stood about 15 feet high. Also some Devonian shells and corals from the same district, in which the lime had been replaced by silica, and which had been cleared from the matrix by the application of muriatic acid.

Dr. Cox exhibited a plant (undetermined) in cultivation by Mr. Scholtz, of Hunter-street, in which the flowers had been succeeeded by bulbils as in *Fourcroya gigantea.* Also a large femur of *Dinornis robustus* from Christ Church, New Zealand.

Mr. Masters exhibited very large and heavy wooden swords from Herbert River, Queensland, resembling boomerangs in shape, together with unusually wide Hielemans or shields from the same district. Also a waddy or club, with the head thickly set with hobnails.

Mr. Hirst exhibited a centipede *(Heterostoma)* 10 inches long, and about ¾-inch broad, from the Herbert River.

Dr. von Lendenfeld exhibited a series of Photographs of Mount Kosciusko, showing the various ways in which the granite rocks are broken down in that locality, partly by frost, and partly by ordinary weathering.

The President drew attention to a singular case of germination of the seeds of an orange within the uninjured fruit before its removal from the tree. The testa was broken, the cotyledons enlarged, free, and green, and the plumule and radicle well developed.

WEDNESDAY, 25TH MARCH, 1885.

The President, Professor W. J. Stephens, M.A., F.G.S., in the chair.

Mr. Sidney Olliff was present as a visitor.

MEMBERS ELECTED.

Mr. J. A. Boyd, Ripple Creek, Queensland; Mr. Sidney Olliff, Australian Museum.

DONATIONS.

"Transactions of the Entomological Society of London." Parts III. and IV. October and December, 1884. From the Society.

"Victorian Naturalist." Vol. I., No. 14. February, 1885. From the Field Naturalists' Club of Victoria.

"Science." Vol. IV., Nos. 81-83; Vol. V., Nos. 102-105. From the Editor.

"Journal of the Cincinnati Society of Natural History." Vof. VII., Nos. 1, 2, and 4. April and July, 1884; January, 1885. From the Society.

"Annali del Museo Civico di Storia Naturale di Genova." Series 2. Vol. I., No. 21. 1884. From the Director.

From L'Academie Impériale des Sciences de St. Petersbourg, "Bulletin." Tome XXVIII. No. 4. Tome XXIX. No. 1. "Mémoires." Tome XXXI. Nos. 9-14.

"Catalogue of Superior Second-hand Books on Sale." From Henry Sotheran and Co.

"Bericht über die Senckenbergische naturforschende Gesellschaft." 1884. From the Society.

"Comparative Vocabularies of the Indian Tribes of British Columbia." "Descriptive Sketch of the Physical Geography and Geology of the Dominion of Canada." With maps. From the Geological and Natural History Survey of Canada.

"Feuille des jeunes Naturalistes." No. 172. February, 1885. From the Editor.

"Zoologischer Anzeiger." No. 187. February 9th, 1885. From the Editor.

Fifty copies "President's Annual Address." From C. S. Wilkinson, Esq., F.L.S., F.G.S.

PAPERS READ.

ON A DEVONIAN FOSSIL ALLIED TO WORTHENIA (DE KONINCK) FROM NEW SOUTH WALES.

PLATE IX., FIGS. 1 AND 2.

BY F. RATTE, ENG. ARTS AND MANUF., PARIS.

This note accompanies the drawings of a probably new fossil from the Devonian limestone of New South Wales.

It has been found among a number of fossils from the Murrumbidgee limestone, which were collected in 1881, by Mr. Chas. Jenkins, author of a note on the Geology of Yass Plains. (1)

Among some fossil Gasteropods, such as *Loxonema anglicum*, *Euomphalus Bigsbyi*, *Murchisonia Verneuiliana*, *M. turris*, which occur, together with a few corals, *Cœnites*, *Billingsia*, *&c.*, described by Prof. de Koninck as Devonian, there are some undescribed Gasteropods. All these fossils are silicified, showing themselves in relief on the weathered surface of the limestone. One of them was obtained in an acceptable condition by dissolving the most part of the limestone in hydrochloric acid.

WORTHENIA ? (De Koninck .) Sp. nov.

This Gasteropod is interesting from the fact of its close relation with a new genus recently made out of *Pleurotomaria* and other genera, by Prof. de Koninck. (2)

This paleontologist acknowledges, in the carboniferous limestone of Belgium, eleven genera in the family *Haliotidæ*. Besides the species maintained in the old genera *Polytremaria*, *Murchisonia*, *Ptychomphalus* and *Porcellia*, he creates seven new genera out of some Turbo, Trochus, Pleurotomaria, Murchisonia, &c. These genera are *Gosseletia*, *Worthenia*, *Baylea*, *Mourlonia*, *Agnesia*, *Rhineoderma and Luciella.*

One of them, the genus *Mourlonia*, has an extensive synonymy being formed out of five genera, including Helix and Euomphalus.

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(1) Explor. of the Caves and Rivers of N.S.W., 1882, and Proc. Lin. Soc., N.S.W., 1879, pp. 21 and 216.

(2) *L. G. de Koninck.* Faune du Calc. Carb. de la Belg., 1883, 4th Part, p. 64.

The author describes five species of *Worthenia*, two of which are from America, whilst four belong to the carboniferous of Belgium.

He differenciates this genus from the others belonging to the same family by the following characters :—

"The angular shape of the whorls, the small width of the band ('bande') of the sinus, comparatively to the size of the species, by the position of this band on the angle of the whorls and its crenulated form." And he adds :

"I don't know any other species in the lower paleozoics that can be referred to this genus."

The want of paleontological works is not very favourable to a further inquiry on the subject. The best marked character which seems to associate the specimen referred to, with Prof. de Koninck's new genus, is the crenulated nature of the periphery.

In short the only specimen in the Museum, can be sketched as follows: Height of spire about $\frac{11}{10}$th inch; width about $\frac{8}{10}$th inch. Shell conical, turriculate, whorls 6 or 8 (?) angular and crenulated on the periphery. Sinus not known, the mouth being broken: mouth slightly polygonal. Number of crenulations in the last half whorl above the periphery about six, large and long, conical; number of crenulations in the centre about eight, narrow; below the periphery crenulations lose and indistinct.

The suture which, in the upper whorls corresponds with the last loosely crenulated border does not show any ornament. Apical angle from 64 to 70° according to position, difficult to appreciate in consequence of the imperfection of the specimen and the size of the ornaments.

If we compare this short description with the five species described by de Koninck, we find a great difference in the crenulations, some of the species from America and Belgium presenting in the last half whorl, 50-60 crenulations above the periphery, while there are only six in the Australian specimen.

Prof. de Koninck's new genera seem to be very closely related to each other, and according to this system one would probably make a new genus of the present fossil, but I will not take the responsibility of it until further works on the subject can be consulted.

THE PHORIOSPONGIÆ. Marshall.

BY R. VON LENDENFELD, PH.D.

In the Zeitschrift für wissenschaftliche Zoologie, Vol. 35, p. 122-126. W. Marshall describes two Sponges as representatives of the new Genus Phoriospongia, which is characterized as Sponges containing a large amount of foreign particles, sand, etc., and also possessing siliceous spicules of the monactinellid type.

Both species have been obtained from Tasmania.

Marshall (l.c.) refers to a few British Sponges described by Bowerbank and others and also to an Australian one described by Gray, all of which contain foreign bodies, sand, etc., besides spicules.

He is inclined to consider all these Sponges, described by himself and others, as boring Sponges which however do not live in rocks or shells as the true Vioa, but which live in sand. They perforate the sand in all directions and so produce a mass similar to a Sponge and containing both the spicule of the Sponge and the sand in which the Sponge took up its abode.

In my extensive collections of Australian Sponges I have not only found the species described by Marshall, again, but I have also found a number of other species hitherto not described, which all possess flesh-spicules and appear nearly related to the Phoriospongiæ. In a paper published in these Proceedings (Vol. IX.,) by me last year, I drew attention to the fact that "flesh-spicules" were sometimes found in Sponges which possess an ordinary horny skeleton without siliceous spicules. Based on this discovery is my subdivision of the families of Ceraospongia into sub-families with and without flesh-spicules.

Up till now I have found in all eleven species of Sponges which should in consequence of the structure of their fibrous skeleton be placed among the Ceraospongiæ, and possess flesh-spicules. With one exception these spicules belong to the monactinellid type. The fibrous skeleton of these Sponges is sometimes composed of "hollow" fibres which do not contain any foreign bodies, sometimes again of solid fibre with or without foreign bodies. The number of foreign bodies in the fibre may increase to such an extent, that hardly any Spongiolin is left between the sand particles. In those cases we are not able to distinguish between main, radial and connecting, tangental fibres. There is only a coarse and irregular network of arenaceous threads to be seen, which may contain different kinds of foreign bodies. There are a great many Australian Sponges with a skeleton of this kind.

Very often we find in these Sponges the well known filaments characterizing the family Hircinida; generally there are no flesh-spicules, but sometimes the latter are met with in these arenaceous Sponges. Often the spicules appear massed around the arenaceous fibres and form a dense coating around them: we have arrived at true Phoriospongiæ.

I do not hesitate to consider the Phoriospongiæ as belonging to the horny Sponge as well as those porifera which, like Dysidea possess an arenaceous skeleton but no flesh-spicules.

From the point of view taken up by Marshall (l.c.) and others, all these horny Sponges with flesh-spicules might be combined to a family for itself. I have however convinced myself of the correctness of my original idea, that *within* any family of Ceraospongiæ, Sponges with flesh-spicules may be produced. We find namely that these flesh-spicules are extremely variable, and that there exists no correlation between them and the structure of the Sponge apparently.

I consider the Phoriospongiæ, not as boring Sponges living in sand; but as Ceraospongiæ belonging to the group with arenaceous irregular fibres.

Vosmaer has recently in a short paper "on the relation between certain Monactinellidæ and Ceraospongiœ" (Mittheilungen der Zoologischen Station in Neapel, Band 5, Seite 490-492), advanced the hypothesis that the horny Sponges are the descendants of the siliceous Monactinellidæ.

As we judge of the relationship of different animals mainly by their morphology, we are of course generally unable to decide which of two similar forms is the ancestor and which the descendant or whether the two are to be considered as brothers.

Vosmaer's hypothesis is very ingenious although I do not see that there are any facts proving its correctness. It is directly opposed to the hypothesis previously published by me (Das System der Monactinellidæ, Zoologischer Anzeiger. Band 1884, No. 164.)

Forms like these Ceraospongiæ with siliceous flesh-spicules may enlighten us on this question. Their production may have taken place in one of the following ways.

1. They are descended from ordinary horny Sponges and the flesh-spicules have been produced sua sponte.

2. They are descended from the Desmacidonidæ, the silicious fibres of which have been converted into arenaceous or horny fibres.

If the second of these alternatives be true, then we will have to consider the flesh-spicules as the conservative part and they would represent the flesh-spicules of the Desmacidonidæ, which had remained unchanged whilst the fibrous skeleton was being transformed.

If the first of these alternatives be true, then we would have to consider these Phoriospongiæ and related sponges, either as transition forms leading from true horny Sponges to the Desmacidonidæ or as the terminations of series, beginning with the ordinary korny Sponges and ending with these forms.

I quite agree with Vosmaer and others that further investigtions will be required to settle these questions. To my own and Vosmaer's publications on the subject the merit is due of having raised the question. As however, these flesh-spicules are much softer and more variable than the spicules in the fibres it seems difficult to understand that the latter should have vanished whilst the former remained during the disilicifying process as Vosmaer asserts.

I would also not be inclined to suppose that the Desmacidonidæ are particularly closely related to these Sponges in the opposite direction. I believe that the flesh-spicules in the Phoriospongiæ and horny Sponges on the one hand, and those of the silicifibred Sponges on the other have been produced independantly of each other.

Some of the flesh-spicules described by Marshall (l.c.) are very common. So particularly ∽ (1). I have found them in seven species of horny sponges. The Parallelapipeds of Marshall I have however, not found anywhere, not even in those specimens which I refer to Phoriospongia solida Marshall, in which Sponge Marshall has found them. I am rather inclined to think that they may have nothing to do with the Sponge. Marshall describes also tr ac and tr^{0} ac in various shapes. I have not found the latter in any other specimens than those which I refer to Marshall's species.

Besides these I have found tr^{2} of various dimensions in three species. In two also a spicule which although anchorate can be considered as rut rut.

One species is characterized by spicules tr ac sp and in one I have found spicules with three equal rays similar to those described by F. E. Schulze of the Plakinidæ.

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(1) I use for the spicules the signs proposed by Vosmaer (Bronn Classen und Ordnungen des Thierreiches. Band II ; u a O) instead of the long and equally unpronouncable and unpractical names.

SYNONYMY OF AND REMARKS UPON THE SPECIFIC NAMES AND AUTHORITIES OF FOUR SPECIES OF AUSTRALIAN MARINE SHELLS, ORIGINALLY DESCRIBED BY DR. JOHN EDWARD GRAY IN 1825 AND 1827.

By John Brazier, C.M.Z.S., &c., &c.

In this paper I have endeavoured to give Dr. Gray credit for his work done in 1825 and 1827, as far as regards his specific names. Three of them have been put down as being described or figured by Wood, Quoy and Gaimard, Sowerby and others.

First we have *Nassa livida* Gray, well described in Captain King's Narrative of a Survey of the Coasts of Australia, Vol. 2, Appendix p. 484, 1827. And from that date the shell has not even been mentioned by those authors who have catalogued or monagraphed the genera, Reeve, Kiener, Marrat and Tryon.

The next species in order is *Strombus australis* Gray, always quoted as of Sowerby.

Then we have *Bulla australis*, Gray described in the Annals of Philosophy, new series, Vol. 9, 1825. It is also mentioned again by Gray in Captain King's Voyages, Appendix Vol. 2, p. 490, 1827. It is always quoted as of Quoy and Gaimard. The shell figured both by Reeve and Sowerby in their works as *Australis* of Quoy and Gaimard is a distinct species, and comes from Tahiti and other Polynesian Islands. Quoy and Gaimard's Shell came from New Holland and not Tahiti.

The next in order is *Bulla lineata* Gray, described in the Annals of Philosophy, new series, Vol. 9, p. 408, 1825. It is quoted by all authors as being of Wood, who was the first to figure it in 1828. I append a list of the synonyms with their references and dates of publication wherever I have been able to ascertain them.

1. NASSA LIVIDA. Gray

1827. *Nassa livida*, Gray in Captain King's Narrative of a Survey of the Coasts of Australia, Vol. 2, Appendix p. 484, No. 57.

(1) *Buccinum unicolorum*, Kiener. Coquilles, Vivantes, p. 6, No. 59. *Buccinum unicolor*, Kiener, pl. 19, fig 69.

1851. *Nassa (Alectrion) unicolor*, Kiener. A. Adams. Proc. Zool. Soc., p. 106.

1853. *Nassa (Zeuxis) unicolor*, Kiener. H. and A. Adams, Genera of Recent Mollusca, Vol. 1, p. 119.

1853. *Nassa unicolorata*, Reeve. Conch Icon., pl. 3, fig. 17.

1853. *Nassa rutilans*, Reeve. Conch. Icon., pl. 22, fig. 147.

1854. *Nassa unicolor*, Hombron et Jacq., Voyage au Pôle Sud l'Astrolabe et la Zélée, Vol. 5, p. 76. Atlas, pl. 21, fig. 13-15.

1873. *Nassa (Zeuxis) unicolor*, Kiener. Paetel, Catalog der Conchylien-Sammlung, p. 35.

1874. *Nassa unicolor*, Kiener. Schmeltz, Museum Godeffroy, Catalog. 5, p. 124, No. 3,699.

1876. *Nassa (Alectrion) rutilans*, Reeve. Brazier, Proc. Linn. Soc., N.S.W., Vol. 1, p. 180, No. 47.

1882. *Nassa (Zeuxis) unicolorata*, Kiener. Tryon Manuel of Conchology, p. 31, pl. 10, figs. 88, 89, 90.

1884. *Nassa unicolor*, E. A. Smith. Voyage of H.M.S. Alert, p. 48, No. 30.

1884. *Nassa (Zeuxis) unicolorata*, Kiener. Brazier, Proc. Linn. Soc., N.S.W., Vol. 9, p. 793, No. 3.

Hab.—New Holland, (*Captain P. P. King*); Cape York, N. Australia (*Jukes*); Darnley Island, Torres Straits, 30 fathoms, sand and mud bottom (*Brazier*); Port Curtis and Port Molle, Queensland, 12-20 fathoms (*Coppinger*); Sir Charles Hardy's

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(1) Spécies General et Iconographe des Coquilles Par L. C. Kiener, continued by Dr. P. Fischer, 1834 up to 1880.

Island, N. E. Australia (*Jukes*; Rockingham Bay, Queensland (*Brazier Eclipse Expedition* 1871); Port Darwin and Port Essington (*E. Spalding*); Cossack, N. W. Australia (*J. F. Bailey*); Ceram (*Hombron* and *Jacquinot*) New Zealand ? ? ? (*Cuming*) Cardwell, Rockingham Bay, Queensland (*E. E. Beddome*); West Australia (*W. H. Hargraves Collection in the Australian Museum*); East Coast of Australia (*Schmeltz.*)

This species was described by Dr. Gray in 1827, and re-described and figured by Kiener in his Coquilles Vivantes, as *Buccinum unicolorum*, he also figures it as *Buccinum unicolor*. A. Adams, in 1851, in a list published in the proceedings of the Zoological Society, of London, classes it as *Nassa unicolor*; and in 1853, Reeve, in his Monograph of the Genus Nassa, calls it *Nassa unicolorata*, and at the same time he calls a variety of it *Nassa rutilans*, said to have come from New Zealand, on the authority of the species maker, Mr. Hugh Cuming, who never visited New Zealand. The species is confined to Torres' Straits. And in 1854, Hombron and Jacquinot also re-describe it in the Voyage Au Pôle Sud as *Nassa unicolor*; they do not make any mention of Kiener's name. In 1873, Paetel, in his Catalog der Conchylien, Sammlung quotes *N. unicolor*, Kiener. Schmeltz, in Museum Godeffroy Catalog V., 1874, quotes *N. unicolor*, Kiener. G. W. Tryon, in his Manual of Conchology, 1882, quotes it as *N. unicolorata*, Kiener. Mr. E. A. Smith, in the Zoology of H.M.S. Alert, 1884, quotes it as *Nassa unicolor*, Kiener. I have also done the same in these proceedings, 1884, as *Nassa unicolorata*, Kiener. Dr. Gray distinctly says that his specimens of *N. livida* were presented to the British Museum by Captain P. P. King. It is quite astonishing that Reeve never mentioned Gray's name, as he had access to figure any species contained in the British Museum.

2. STROMBUS AUSTRALIS. Gray.

1827. *Strombus Australis*, Gray. In King's Narrative of a Survey of the Coasts of Australia. Vol. 2. Appendix, p. 489, No. 90.

1842. ***Strombus Australis***, Sowerby. Thes. Conch., Vol. 1, p. 36, sp. 53, figs. 96, 97.

1843. ***Strombus Australis***, Sowerby. Kiener, Coq. Viv. Strombus, p. 21, pl. 14, fig. 1.

1843. ***Strombus Australis***, Sowerby. Deshayes in Lam. Anim. Sans Vert., 2nd edition, Vol. 9, p. 716, No. 41.

1845. ***Strombus Australis***, Sowerby. Kuster's in Conch. Cab., 2nd edition, p. 30, pl. 13., fig. 2.

1851. ***Strombus Australis***, Sowerby. Reeve, Conch. Icon. pl. 14, sp. 34.

1854. ***Strombus (Monadactylus) Australis***, Sowerby. H. and A. Adams, Genera of Recent Mollusca, Vol. 1, p. 259.

1867. ***Strombus Australis***, Sowerby. Mitchell in Catalogue of the Mollusca in the Collection of the Government Central Museum, Madras, p. 18, No. 2.

1873. ***Strombus Australis***, Sowerby. Paetel. Catalog. der Conch. Sammlung, p. 7, 52.

Hab.—West Coast of New Holland (*Captain P. P. King*); Rowley Shoals, West Coast of Australia (*J. F. Baley*); West Australia (*Sir William Denison* and *Australian Museum*): Cape York, North Australia and West Australia (*W. H. Hargraves*'s *Collection in Australian Museum*); Nicol Bay, North West Australia (*Brazier*).

This is another of Dr. Gray's species described in Captain King's Narrative of a Survey of the Coast of Australia, Vol. 2, p. 489, 1827, the type specimens collected by Captain King were presented by him to the British Museum, and since that date all Monographers from Kuster, Sowerby, Reeve, and Kiener quote Sowerby as the authority of the species. Dr. Gray had the practice of putting specific names very often to species in the British Museum but not attaching his name to them, no doubt that is the cause of the error.

3. BULLA AUSTRALIS. Gray.

1825. *Bulla australis*, Gray in Annals of Philosophy, New Series, Vol. 9, p. 408.

1827. *Bulla australis*, Gray in Capt. King's Survey of Australia, Vol. 2, Appendix p. 490, No. 92.

1833. *Bulla Australis*, Quoy and Gaimard. Voyage de l'Astrolabe Zoologie, Vol. 2, p. 357. Atlas, pl. 26, figs. 38-39.

1835. *Bulla australis*, (Gray), in Yates' account of New Zealand Appendix p. 308.

1836. *Bulla australis*, Quoy and Gaimard. Deshayes in 2nd edition of Lamarck, Vol. 7, p. 673.

1843. *Bulla Australis*, Gray. King's Voyage in Dieffenbach New Zealand, Vol. 2, p. 243, No. 114.

1850. *Bulla australis*, Quoy. Jays Catalogue of Shells, 4th edition, p. 112, No. 3174.

1854. *Bulla oblonga*, A. Adams in Sowerby Thes. Conch., Vol. 2, p. 577, No. 50, pl, 123, fig. 74.

1854. *Bulla oblonga*, H. and A. Adams. Genera of Recent Mollusca, Vol. 2, p. 16.

1854. *Bulla australis*, Quoy and Gaimard. H. and A. Adams, Mollusca, Vol. 2, p. 16.

1859. *Bulla australis*, Chenu (non Quoy and Gaimard). Manuel de Conch., Part 1 p. 389, fig. 2938.

1859. *Bulla oblonga*, A. Adams. Chenu, Manuel de Conch., Part 1, p. 389, fig. 2940.

1865. *Bulla australis*, Quoy and Gaimard. Angas, Proc. Zool. Soc. p. 188.

1867. *Bulla oblonga*, A. Adams. Angas, Proc. Zool. Soc., p. 226.

1868. *Bulla oblonga*, A. Adams. Reeve, Conch. Icon., pl. 3, species 9, fig. a.b.c.

1873. *Bulla oblonga*, A. Adams. Hutton, Manual of New Zealand Mollusca.

1873. *Bulla australis*, Quoy and Gaimard. Von Martens Critical List of New Zealand Mollusca, p. 38.

1873. *Bulla australis*, Quoy. Paetel, Cat. der Conch. Sammlung, p. 81.

1877. *Bulla oblonga*, A. Adams. Tenison-Woods, Proc. Royal Soc. Tasmania, p. 47.

1878. *Bulla oblonga*, A. Adams. B. Australis, Gray. Hutton in Journal de Conch, 3rd series, Vol. 26, p. 40.

1880. *Bulla oblonga*, Adams. B. Australis, Gray. Hutton, Manual of the New Zealand Mollusca, p. 121.

Hab.—New Holland (*Berry, Captain, P.P. King*): King George's Sound, South West Coast of Australia (*Quoy and Gaimard*); East Coast of New Zealand (*Yate's*); New Zealand (*Dieffenbach*); Tasmania (*C. E. Beddome, W. F. Petterd, Tenison-Woods*); Port Jackson, near the Sow and Pigs Reef, from 2 to 5 fathoms on a grassy bottom (*Brazier*); Spencers and St. Vincent's Gulf, South Australia (*G. F. Angas*); Port Lincoln and Adelaide, South Australia (*G. Masters* and *Australian Museum*); Australia (*Mr. F. Strange in Museum of the Asiatic Society of Bengal*).

This is a complete history of this unfortunate species, and the way authors have treated it since being first described by Dr. Gray in the Annals of Philosophy, new series, Vol. 9, p. 408, 1825, and again in 1827, in Captain King's survey of Australia, Vol. 2. In 1833, Quoy and Gaimard usurp Dr. Gray's specific name; and in 1835, Dr. Gray, in Yate's account of New Zealand, quotes his own *Bulla australis*, and refers to King's Voyage to New Holland. Deshayes in Lamarck's 2nd edition, 1836, makes no mention of Grey, but quotes Quoy and Gaimard as the authority. Dr. Gray in Dieffenbach's New Zealand, 1843, also mentions his *Bulla australis*. A. Adams in Sowerby, Thes. Conch., 1854, re-describes it as *Bulla oblonga*; also quotes it in the Genera of Recent Mollusca of Henry, and Arthur Adams at the same they quote *Bulla australis*, Quoy. Chenu in his Manuel de Conch., figures a species at fig. 2938, as *Bulla australis*, the species so figured is not the *Bulla australis*, Quoy, which is the *Bulla australis* of Gray. Chenu also figures the *Bulla oblonga*, A. Adams, which is the *Bulla australis*, of Gray also Quoy. Mr. Angas, in 1865, quotes *Bulla australis*, Quoy and Gaimard, from South Australia, and in 1867, he quotes it as *Bulla oblonga*, A. Adams, from Port Jackson. Reeve, in 1868, treats it as *Bulla oblonga*, A. Adams. The *Bulla* called *Australis*, and figured as such in the Conch. Icon., as of Quoy and Gaimard, is not that shell but a distinct species from Tahiti and other Pacific Islands. Mr. A. Adams, in Sowerby's Monograph, gives Quoy and Gaimard's description for a shell from New Holland, and figures another shell for it from Tahiti. In 1873, Professor Hutton quotes it as *Bulla oblonga*, Adams; in the same year Von Martens, in his critical list of New Zealand, quotes it as *Bulla australis*, Quoy, a common shell of New Holland. In the same year it is quoted by Paetel in his catalogue as *Bulla australis*, Quoy, from Adelaide, and *Bulla oblonga*, A. Adams, from the Philippine Islands, the latter locality is an invention of Mr. Cuming. In 1877, Tenison-Woods quotes it as *Bulla oblonga*, A. Adams, and says that it has been confounded with *Bulla australis*, Quoy, a shell found at Tahiti. In 1878, Professor Hutton quotes it as *Bulla oblonga*, A. Adams, *Bulla australis*, Gray, he also repeats the same error. In 1880, in the Manual of New Zealand Mollusca, he quotes Dieffenbach, New Zealand, for his information, but his quotation is entirely wrong. The information that I have found in Dieffenbach, New Zealand, Vol. 2, p. 243, No. 114, 1843, is *Bulla australis*, Gray, King's Voyage, so that it is quite evident that Dr. Gray did not forget that he had mentioned it in King's Voyage in 1827.

The *Bulla australis* of A. Adams in Sowerby Thesaurus Conchyliorum from Tahiti, found on reefs Cuming is quite a distinct species from the *Bulla australis*, Gray, and Quoy and Gaimard. Adams species requires a new specific name. *B. australis*, Gray is never found on reefs, its home is deep water, and it is generally washed on shore after light gales in countless hundreds, about the deep bays of Port Jackson and Botany Bay. The *B. australis*, A. Adams, is found on reefs, we obtained it at the Home Island, Palm Island, North East Australia; Bet and Darnley Islands, Torres Straits, Chevert Expedition. I quoted it as *Bulla australis*, Quoy and Gaimard, in the Proc. Linn. Soc., N.S.W., Vol. 1, p. 83, on the authority of the monograph of the Family Bullidæ, by Mr. Arthur Adams, in Sowerby's Thes. Conch, Vol. 2, p. 576, No. 45, pl. 122, figs. 64, 65, 66. As it requires a new name it may be called *Bulla Adamsi*, Brazier.

I am under great obligation to Dr. George Bennett, F.L.S., for his great kindness in lending me Dieffenbach's Work on New Zealand, for reference (2); unfortunately it is a work that is not to be found in the Australian Museum or the Free Public Library. There is a copy of Yate's New Zealand in the Free Public Library, and while writing this paper I secured in a second-hand book-shop a very fine copy of the same work.

4. BULLINA LINEATA. Gray.

1825. *Bulla lineata*, Gray. Annals of Philosophy, new series, Vol. 9, p. 408.

1828. *Bulla lineata*, Br. Mus. Wood in Supplement to the Index Testaceologicus, p. 9, No. 1, pl. 3, fig. 1, Bulla.

1850. *Bulla lineata*, Grag. Jay's Catalogue of Shells, 4th edition, p. 113, No. 3,189.

1854. *Bulla (Bullina) lineata*, Wood. A. Adams in Sowerby's Thes. Conch., Vol. II., p. 563, No. 2, pl. 120, fig. 2.

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(2) I have to thank my kinsman, Mr. R. C. Rossiter, of Noumea, New Caledonia, for his liberal and generous action in presenting me with the whole of the Zoology of the Voyage of the Astrolabe.

1854. *Bullina undata*, H. and A. Adams. Genera of Recent Mollusca, Vol. 2, p. 8, Vol. 3, pl. 56, fig. 5a, not *Bulla undata* of Brug.

1856. *Bulla lineata*, Wood. Hanley's Edition of Wood, Index Test Supplement, p. 209, pl. 3, fig. 1.

1859. *Bullina lineata*, Wood. Chenu. Manual de Conch., Vol. 1, p. 387, fig. 2,915.

1860. *Bullina lineata*, W. Theobald. Junr. Catalogue of the Recent Shells in the Museum Asiatic Society of Bengal, p. 114.

1867. *Bullina lineata*, Wood. Angas., Proc. Zool. Soc., p. 225.

1870. *Bullina lineata*, Wood. Reeve, Conch. Icon., pl. 1, fig. 2, a. b.

1873. *Aplustrum lineatum*, Hutton. Catalogue of New Zealand Mollusca.

1873. *Bullina lineata*, Wood. Pætel, Catalog. der Conch., Sammlung, p. 81.

1878. *Aplustrum lineatum*, Hutton. Journal de Conch., 3rd series, Vol. 26, p. 40, No. 243.

1880. *Bullina lineata*, Wood. Hutton, Manuel of New Zealand Mollusca, p. 120.

1882. *Bullina lineata*, Wood. Dunker in Index Molluscorum Maris Japonica, p. 163.

1883. *Bullina lineata*, Wood. Tyron, Structural and Systematic Conchology, Vol. 2, p. 361-428, pl. 87, fig. 44.

Hab.—New Holland, (*Mr. E. Barnard*); Coogee Bay, New South Wales, (*G. F. Angas, Brazier*); Middle Harbour, (*G. F. Angas*); Moon Islet, Lake Macquarie, New South Wales, (*W. H. Hargraves*); Shark Island, Port Jackson, in rock pools, (*Brazier*); Hauraki Gulf, New Zealand, rare, (*F. W. Hutton*).

This species was described by Dr. Gray in 1825 and Mr. W. Wood finding it in the British Museum in 1828 figures it in the Supplement to the Index Testaceologicus and calls it *Bulla lineata*, Br. Mus., found on the tablets in the British Museum. It should be removed from the Family Bullidæ and placed in the Family Tornatellidæ. All the specimens that I have found, had when extracting the animal a small, horny, linear, trans verse operculum like the Tornatellidæ. Mr. Angas in 1867 remarks on this species :—" No one can fail to detect this pretty species, banded with two lines of rose-colour, and painted with wavy longitudinal stripes of the same hue. It forms a beautiful object in the water, when crawling about on the sandy bottoms of the rock pools left by the receding tide, the expanded membranceous foot of the animal being bordered with azure-blue. On examination I found it had a small, horny, linear, transverse operculum like the *Actæonidæ*, and ougth therefore probably to be included in that family."

NOTES ON THE AUSTRALIAN AMPHIPODA.

By William A. Haswell, M.A., B.Sc.

(Plates X.—XVIII.)

I. Talitrus sylvaticus.

(Plate X., Fig. I.)

Talitrus sylvaticus, Haswell, Proc. Linn. Soc., N.S.W., Vol. IV., p. 246, pl. VII., fig. 1.

Talitrus affinis, Haswell. L.c., Vol. V., p. 97, pl. V., fig. 1.

The specimen originally figured was a female. I give here a figure of the posterior gnathopod of the male.

II. Allorchestes.

Of the species of *Allorchestes* common on the coast of New South Wales there are three which are very well marked and distinct. These are *A. longicornis*, *A. crassicornis*, and *A. rupicola.* The first two are entirely unlike any of the three species which have been described by Dana as occurring in Australia. The first, *A. longicornis* (pl. X., figs. 6-8), is characterised by the extreme length of the inferior antennæ, which are as long as the head and pereion, the flagellum being nearly three times as long as the peduncle, and composed of thirty articuli. *A. crassicornis*, again, (pl. X., figs. 2-5), has the inferior antennæ scarcely so long —a little longer than the head and first three segments—but extremely thick both as regards the peduncle and the flagellum; the latter somewhat longer than the former, composed of twelve segments, of which those near the base are very thick. Both peduncle and flagellum are densely fringed with hairs. (1)

A. rupicola (pl. X., figs. 9-12) has the antennæ of moderate length and thickness, the lower with only twelve joints in the flagellum, and has a prominent rounded process on the carpus of the anterior gnathopoda, such as occurs also in *A. crassicornis.* It is possible that Dana's *Allorchestes humilis* may be a young form of this species, but there is nothing in his description or figure to indicate that his species had the characteristic features which I have described.

A. niger (pl. XI., figs. 1-3) is distinguished from *A. rupicola* only by the form of the anterior gnathopoda, and by having the inferior antennæ relatively longer, with 21-23 joints in the flagellum.

A. Gaimardii, Dana, is characterized by the union of the proximal articuli of the inferior antennæ into one piece, which appears like an additional segment of the peduncle.

A. australis, which Dana describes as being found at Illawarra, I cannot identify with any of the species I have seen. The description and figure most nearly resemble *A. rupicola,* but with well-marked differences.

III. NEOBULE ALGICOLA.

(Plate XI., figs. 4-6.

Neobule algicola, Haswell, Proc. Linn. Soc., N.S.W., Vol. IV., p. 255, pl. VIII., fig. 4.

Rathke's genus *Hyale,* which is placed by Dana in the "Lysianassinæ," is seemingly nearly related to *Neobule,* having the last pair of pleopoda double-branched, but otherwise resembling *Nicea.* It may be, therefore, that, if *Hyale* should prove to possess the arrangement of the gnathites characteristic of the Orchestidæ, *Neobule* will require to be united with it.

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(1) The species described and figured by Mr. Chas. Chilton as *Allorchestes crassicornis* is not this species but the female of *Talorchestia quadrimana,* Dana; (Proc. Lin. Soc., N.S.W., Vol. IX., p. 1035, pl. XLVI., fig. 1.)

IV. ASPIDOPHOREIA.

This genus stands between *Allorchestes* and *Nicea*, differing from both in the large size of the anterior coxæ, from *Allorchestes* also in the character of the telson, and from *Nicea* in the large size of both upper and lower antennæ, and in having the lower pair much larger than the upper.

V. STEGOCEPHALUS LATUS.

(Plate XI., figs. 7-12.)

Stegocephalus latus, Haswell, Proc. Linn. Soc., N.S.W., Vol. IV., p. 252, pl. VIII., fig. 2. Cat. Aust. Crust., p. 227.

I give here an improved figure of this species from a second specimen from the same locality (Tasmania.)

The second and third joints of the peduncle of the superior antennæ are both very short. The appendage consists of two joints, a short basal and a long distal one, and is terminated by a long slender spine with a few minute hairs round the base; the flagellum contains only four articuli, the first being much larger than the others; the first and second have each a long slender spine connected with the distal end; at the end of the last joint is a small fasciculus of small, slightly hooked hairs. The inferior antennæ have six joints in the flagellum in the Tasmanian specimens, but only three in a specimen from New South Wales, which appears to be a variety of the same species. (1)

VI. AMPELISCA AUSTRALIS.

(Plate XII., figs. 7-16 and Plate XIII., figs. 1-4.)

Ampelisca australis, Haswell, Proc. Linn. Soc, N.S.W., Vol. IV., p. 257, pl. VIII., fig. 3. Cat. Aust. Crust., p. 235.

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(1) By an error the word "sub-chelate" was substituted for "subpediform" in the original description of the gnathpods. (Proc. Linn. Soc., N.S.W., Vol. IV., p. 252, line 21.)

This species would seem to be subject to a considerable amount of variation. A specimen from Port Denison resembles the original specimen from Port Jackson in the proportions of the body and of the coxæ, in the pleopoda and the telson and the gnathopoda; it is distinguished from the latter by the greater length of the superior antennæ, which are as long as the head and first three segments, and the flagellum of which consists of fifteen narrow articuli; and also by the form of the basal joints of the fifth pair of pereiopods (fig. 10.) The lower antennæ are broken.

Another specimen (figs. 11-16) from Port Jackson, resembles the first in all points, except that the basal joint of the third pair of pereiopoda is of a slightly different shape.

In a specimen from Port Stephens, the superior antennæ are as long as the head and first four segments, and its flagellum consists of about twenty segments. The inferior antennæ are considerably longer, being longer than the head and pereion of the animal; the peduncle is very long and slender, equalling in length the whole of the superior antennæ. The basal joint of the last pair of pereiopods differs a little in from that of either of the other specimens.

In the Port Stephens and Port Denison specimens, the third pair of pereiopoda terminate in a hair-like spine, which represents the terminal joint, while in the Port Jackson specimen there is a distinct, though small dactylus.

VII. LYSIANASSA AND ANONYX.

(Plate XII., figs. 1-6.)

The species named by me *Lysianassa nitens* is better placed in the nearly related genus *Anonyx*, the anterior gnathopoda having a feebly developed, almost transverse palm (pl. XII., figs. 1 and 2) which gives them a sub-cheliform character. The telson is deeply cleft.

The nearest relative of this species would seem to be *Anonyx Edwardsii* of Kröyer, the principal points of distinction apparently being the greater number of joints (ten) in the flagellum of the superior antennæ of the present species, the broader form of the propus of the posterior gnathopod, and its stronger dactylus.

Lysianassa australiensis, (Plate XII., figs. 3 and 4) on the other hand, has the anterior gnathopoda non-prehensile; while the telson is divided to the base. It is to be distinguished from *A. Kröyeri* chiefly by the form of the terminal joints of the posterior gnathopod, as well as by the non-prehensile anterior gnathopods. The following is a more detailed description of *L. australiensis* :—

The eyes are reniform, rather large, but not nearly meeting above. The fourth segment of the pleon has a depression on its dorsal aspect. The superior antennæ are about equal in length to the head and the first segment; the first joint thick, slightly convex on its dorsal border, scarcely projecting beyond the angular process of the head; the second and third segments are very short; the flagellum is scarcely longer than the peduncle, of ten articuli, the appendage with five or six. The inferior antennæ are of the same length as the superior, much slenderer: the flagellum and peduncle are of nearly equal length, the former with ten joints. The first pair of gnathopods are obscurely sub-cheliform, the propus having at its distal end an obscure lobe armed with a pair of stout spines against which the dactylus works. The posterior gnathopods are characterised by the extreme smallness of the dactylus, which is nearly terminal and is ornamented, together with the apposed palmar border, with some minute cilia: the ventral border of the propus is ornamented with a row of short setæ and the distal border with a fasciculus of more slender hairs. The telson is cleft to the base; each of the halves is ornamented with three short conical spines.

The above description would apply equally well to *L. nitens*, as far as the antennæ, anterior gnathopoda and telson are concerned, except that the flagellum of the superior pair is a little shorter in the latter species. The main difference between the two species lies in the posterior gnathopoda, which in *L. nitens* have a concave terminal palm with a well developed dactylus.

L. affinis (pl. XII., figs. 5 and 6) differs from both of these in the size of the eyes, which nearly meet above, and in the great length of the inferior antennæ. The segments of the flagellum of the superior antennæ are also more numerous. The posterior gnathopoda are similar to those of *L. nitens*; the telson is likewise deeply cleft, with a conical spine on each half.

VIII. EUSIRUS.

EUSIRUS DUBIUS, Var.

(Plate XIV., fig. 1).

Eusirus dubius, Haswell, Proc. Lin. Soc. N.S.W, Vol. IV., p. 331, pl. XX,, fig. 3; Cat. Aust. Crust., p. 247.

The first and second pleonal segments have each five spines on the posterior border. The fourth and fifth segments are dorsally carinated—the carinæ produced posteriorly into acute teeth. The superior antennæ are as long as the cephalon and first three segments of the pereion; the first joint of the peduncle is stout, longer than the head; the second is about a third of the length of the first; the third is very small; the flagellum is somewhat longer than the peduncle, of 21 articuli; the appendage is composed of 8 rather elongate articuli. The inferior antennæ are a good deal longer than the superior, nearly as long as the cephalon and pereion; the peduncle is stout, the fifth joint the largest, broad and laterally compressed; the flagellum is short, not so long as the last segment of the peduncle, of 15 joints. The anterior gnathopods are large; the carpus has the palmar process about a fourth of the length of the propus; the propus is ovate, twice as long as broad, the palm defined by a small tooth. The posterior gnathopods are similar to the anterior pair, but larger. The posterior pleopods have the rami ovate-lanceolate, acute, with a few serrations. The telson is deeply cleft, each half ending in two acute spines, the outer of which is more prominent than the inner.

Length, exclusive of antennæ, about ¼ of an inch.

Port Jackson.

This variety differs from that originally described, which was obtained in Tasmania, in the greater thickness of the inferior antennæ, and the absence of a spine on the last segment of the pereion, besides other minor points.

EUSIRUS AFFINIS. N. sp.

(Plate XIV., figs. 2-4).

The second and third segments of the pleon are each armed with a few minute spines in the middle of the posterior border; the following three have each a very small mesial tooth. The superior antennæ are as long as the head and first four segments; the first joint of the peduncle is as long as the head, stout; the second joint is about half the length of the first and narrower; the third is very small; the flagellum is nearly twice as long as the peduncle, with 22 articuli; the appendage is well developed, nearly half the length of the flagellum, with fourteen articuli. The inferior antennæ are considerably longer than the superior pair, being as long as the head and the first six segments of the pereion; the peduncle is stout, the fifth joint rather longer than the fourth, but scarcely so thick; the flagellum is tolerably stout, a little longer than the last joint of the peduncle, of more than twenty-two articuli. The gnathopods and pereiopods are similar to those of *Eusirus dubius.*

The length is $\frac{7}{20}$ths of an inch.

Port Stephens.

IX. LEUCOTHOE SPINICARPA.

Miers (Crust. of "Alert," p. 313), following Bœck, identifies *L. articulosa* with *L. spinicarpa,* and regards *L. commensalis* as a variety of that species. *L. gracilis* and *L. diemenenis* are to be regarded as marked varieties of the same.

X. ATYLUS HOMOCHIR. N. s.

(Plate XIII., figs. 5-7)

The cephalon is produced into a well-developed rostrum. The whole of the body is dorsally carinated, but in none of the segments does the carina become divided into teeth except on the fourth and fifth segments of the pleon; the fourth segment of the pleon presents two teeth—one anterior small, and a posterior very large; the tooth on the fifth segment is also large, but a little smaller than the larger of the two on the fourth segment. The telson is deeply cleft, each half armed with a short spine. The superior antennæ are as long as the head and first five segments of the pereion, very little longer than the peduncle of the inferior pair; the first two segments of the peduncle are nearly equal in length, but the first is stouter than the second; the third is small, scarcely distinct from the articuli of the flagellum; the flagellum is a little longer than the peduncle, of thirteen long narrow uniform articuli. The inferior antennæ have the flagellum composed of eleven long narrow articuli. The terminal joint of the mandibular palp is not curved; the toothed edge and accessory plate have each five or six teeth. The gnathopods are sub-equal, similar, the posterior pair with the propus a little longer; neither merus nor carpus develope processes; the propus is ovate, ornamented along the lower border with stout simple setæ; the palm is oblique. The dactyli of the pereiopods are stout, with a slender spine on the ventral aspect near the apex. The last pair of pleopods are large, the rami rather more than twice the length of the protopodite, serrated and armed with short stout setæ.

Length, inclusive of antennæ, $\frac{3}{10}$ths of an inch.

Port Stephens.

The nearest relative of this species seems to be *A. Swammerdamii* of Milne-Edwards (Bate and Westwood, Vol. I., p. 246.)

XI. DEXAMINE MIERSII. N. sp.

(Plate XIII., figs. 8-12.)

The head has a short, blunt rostrum. The eyes are large, reniform. The antennæ are very long and slender; the upper pair are a little shorter than the lower, the basal joint of the peduncle shorter than the head, stout, the second joint nearly twice as long as the first, narrowing towards its extremity, the third not distinguishable from the articuli of the flagellum; the flagellum much longer than the peduncle, of about 30 articuli. The lower antennæ are as long as the body. The fourth joint of the peduncle is very long, longer and rather stouter than the second joint of the superior pair, ornamented with numerous short fine cilia; the fifth joint is small, about ⅓rd of the length of the fourth; the flagellum is very long, with nearly 40 articuli. The coxæ are very small. The first pair of gnathopods are a little stouter than the second, the carpus of both is sub-triangular in lateral outline; that of the second more elongated; the propodes are similar, sub-triangular, with oblique, slightly concave palm. The pereiopods are slender, with powerful falciform dactyli and stout setæ. The third segment of the perion has a short acute tooth on each side on the dorsal portion of its posterior border; the fourth segment has a strong subacute tooth. The sixth pair of pleopods are large, with lanceolate acute rami, bordered with a few setæ. The telson is double, the halves long and narrow, slightly excavated at the extremity. The surface is ornamented with very minute crimson dots.

Thursday Island, Torres Straits.

XII. MEGAMŒRA SUENSIS.

(Plate XV., figs. 1-4.)

Megamœra suensis, Haswell, Proc. Lin. Soc., N.S.W., Vol. IV., p. 335, pl. XXI., fig. 5; Cat. Aust. Crust., p 260.

For a detailed description of the ordinary form of this species see Miers, Crustacea of H.M.S. "Alert," p. 317.

I give here (pl. XV., figs. 1-4,) figures of a species from Port Stephens which is very nearly related to *Megamœra suensis*, and yet differs from it in several particulars.

The body is slender, without spines, except on the third segment of the pleon, which has a few minute spines on the posterior border of its pleural portion and a row of setules on the inferior border. The eyes are long and narrow. The superior antennæ are nearly as long as the body. The first joint of the peduncle is as long as the head and the first segment of the pereion: the second is longer than the first and very slender: the third is very small; the flagellum is as long as the peduncle, of 38 articuli; the appendage has 6 articuli. The inferior antennæ are a little longer than the peduncle of the superior pair, the fourth joint of the peduncle is the longest; the flagellum is about equal in length to the last joint of the peduncle, and is composed of 13 articuli. The anterior gnathopods have the carpus and propus ovate—the palm not defined. The posterior gnathopods of the male are unequal, the right the larger; the merus of both, as well as those of the anterior gnathopods are produced below into an acute tooth; the propus is rather oblong, rather narrower proximally than distally, twice as long as broad; the palm is nearly transverse, but a little oblique, defined by a strong acute tooth and armed with two blunter teeth towards the base of the dactylus, the upper tooth being the larger and bifid; the dactylus is not abruptly curved, about half the length of the propus. The left posterior gnathopod is a little smaller than the right, with the teeth of the propus much less strongly marked. The posterior gnathopods of the female (?) are also unequal—the right the larger and having the palm defined by a short acute tooth and armed with four or five denticles; the left without any teeth on the propus. The last two pairs of pereiopods are very long, nearly as long as the head and pereion, with narrow basa. The last pair of pleopoda are of immense size, as long as the head and the first four segments of the pereion, the protopodite as long as the last two segments of the pleon, the rami more than twice as long as the protopodite, ovate-lanceolate, with serrated edges. The halves of the telson are long and narrow, with a deep terminal notch. The total length, inclusive of the antennæ and the pleopoda, is 1¼ inch.

This species bears a considerable general resemblance also to *Mœra hamigera* but the modification of the left posterior gnathopods in this latter species is so special as to distinguish it very clearly.

XIII. MEGAMŒRA MASTERSII.

Megamœra Mastersii, Haswell, Proc. Linn. Soc., N.S.W., Vol. IV., p. 265, pl. XI., fig. 1.

Megamœra Thomsoni, Miers, Zoology of H.M.S "Alert," Crustacea, p. 318, pl. XXXIV., fig. 1B.

These two forms are so closely related to one another that I think they are scarcely to be regarded as distinct species. My specimen of *M. Mastersii* agrees exactly with Miers's description and figure, except that the spinules on the pleon are absent, and the telson has on each division only a single notch placed near the extremity, with a short setule.

XIV. MŒRA SPINOSA, MŒRA RUBRO-MACULATA, and MŒRA RAMSAYI.

(Plate XV., figs. 5-12.)

The differences on account of which the first and last of these forms were separated from the second were mainly in the form of the posterior gnathopoda. I find, however, on examining a series of specimens, a perfect series of gradations in this respect from the form figured by Stimpson to typical forms of *M. spinosa* and *M. Ramsayi*. Some of these varieties are figured in outline in the plate.

Mr. Chilton's *Mœra festiva* belongs also to this very variable species. (Proc Linn. Soc., N.S.W., Vol. IX., p. 1037, pl. XLVI., fig. 2.)

XV. XENOCHEIRA FASCIATA.

(Plate XVI., figs 1-3.)

Xenocheira fasciata, Haswell, Proc. Linn. Soc., N.S.W.. Vol. IV., p. 272, pl. XI., fig. 6.

I give here an enlarged figure of the posterior gnathopoda, the remarkable form of which distinguishes the genus.

In most of its characteristics this species shows evident relationships with *Microdeuteropus*. In fact it is only the form and proportions of the gnathopoda (figs. 1 and 2) that separate it from the normal members of that genus, with which it is connected through the European *M. versiculatus*, Spence Bate.

XVI. HAPLOCHEIRA TYPICA.

(Plate XVI., figs. 4-8.)

Haplocheira typica, Haswell, Proc. Linn. Soc., N.S.W., Vol. IV., p. 273, pl. XI., figs. 2.

This curious species, which is not uncommon on the Coasts of New South Wales and Victoria, was placed by me originally with the Gammaridæ; a further examination shows that its relations are rather with the Podocerides, the last pair of pleopods (fig. 7.) being short, with slightly hooked spines on the outer ramus, and a very short inner ramus with a simple pointed spine, and the telson (fig. 8), being a small undivided plate with a strong hook at each of its postero-lateral angles.

The superior antennæ have small two-jointed appendages—a feature which I overlooked in my first examination. The flagellum of the inferior antennæ has three distinct joints. The anterior gnathopods (fig. 4) might be described as very imperfectly subcheliform—the propus having a small lobe at the base of the dactylus.

The nearest ally of the genus seems to be *Corophium*, and *C. Lendenfeldi* of Chilton (Trans. N. Z. Inst., Vol. XVI., p. 260, pl. XXI., figs. 1, a. to e.) is probably this species.

XVII. HARMONIA CRASSIPES.

(Plate XVI., fig. 9.)

Harmonia crassipes, Haswell, Proc. Linn. Soc., N.S.W., Vol. IV., p. 330, pl. XIX, fig. 3.

The relations of this species were not correctly expressed by the position in which it was placed in the "Catalogue of Australian

Crustacea." It is a member of the family *Corophiidæ*, distinguished from *Amphithoë*, *Sunamphithoë* and *Nænia*, among other points, by the presence of an appendage on the superior antennæ, from *Cerapus* by the biramous character of the posterior pleopoda, and from *Podocerus* by the multi-articulate flagella of both pairs of antennæ. The genus may be defined as follows:—Coxæ not so deep as the corresponding segments; antennæ both with multi-articulate flagella, the superior pair with an appendage. Mandibles palpigerous. Maxillipedes unguiculate, sub-pediform, with a squamiform process on the basos only. Gnathopods sub-chelate, unequal, posterior pair very large. Posterior pleopods biramous, the outer ramus with slightly hooked spines and straight hairs, the inner with straight hairs only. Telson single, long, pointed.

Harmonia crassipes has been found by Mr. Chilton in New Zealand.

XVIII. CYRTOPHIUM.

Of the Australian species which I have referred provisionally to this genus, only one—viz., *C. minutum*—really belongs to Dana's genus *Cyrtophium* as defined by Spence Bate (Cat. Amphip., p. 273); *C. dentatum*, together with two species to be described below, differs from it in the superior antennæ having a short, multi-articulate flagellum and a well-developed secondary appendage. *C. hystrix* differs from the type species of *Cyrtophium* in the presence of only five segments in the pleon. I gather from a remark made by Spence Bate, (British Sessile-eyed Crustacea, p. 483) that the genus *Læmatophilus* of Bruzelius is distinguished from *Cyrtophium* by the absence of the second last pair of pleopods, and have provisionally removed *C. hystrix* to that genus. For the species with multi-articulate flagella and appendages to the superior antennæ I propose the name of *Dexiocerella*. Connecting them with the typical species is *C. parasiticum*, which has the flagellum of the lower antennæ well developed and indistinctly multi-articulate, but has no appendage to the superior antennæ.

CYRTOPHIUM PARASITICUM.

(Plate XVII., figs. 1-7.)

Cyrtophium parasiticum, Haswell, Proc. Linn., Soc., N.S.W., Vol. IV., p. 274, pl. XII., fig. 1. Cat. Aust. Crust., p. 271.

The superior antennæ of this species are nearly as long as the head and pereion; the first joint of the peduncle is a little shorter than the head and stout, the second more than twice as long, narrower, the third a little shorter and narrower than the second; the flagellum is equal in length to the last joint of the peduncle, composed of four joints, the first more than half the length of the whole flagellum, the others small. The lower antennæ are very large, as long as the head and body, and are very stout; the fifth segment of the peduncle is a little longer than the fourth; the flagellum is a little more than half the length of the fifth segment of the peduncle, and exhibits very slight traces of division into nine joints; the extremity is ornamented with a fasciculus of short spines which are very slightly bent or hooked at the ends. The anterior gnathopods have the propus ovate, the palm even, slightly convex, separated off from the rest of the border by being more prominent. The posterior gnathopods are large; neither merus nor carpus have tooth-like processes; the propus is narrow, ovate, constricted proximally; the palm with a prominent acute tooth at its proximal end (the middle of the propus), separated by a deep excavation from the distal portion, which is minutely denticulated; the dactylus is about three-fourths of the length of the propus. The protopodite of the fourth pair of pleopoda projects beyond the extremity of the telson; the rami are long and narrow, the outer being much shorter than the inner, the inner is obscurely serrated, and both are tipped with straight spines. The fifth segment has no appendages.

The posterior gnathopoda of male specimens vary within certain limits, the palmar tooth being more or less prominent, and the propus being sometimes bordered with long hairs, sometimes not

The female differs from the male (1) in having the body broader (2) in the form of the posterior gnathopoda. (Figs. 6 and 7.)

DEXIOCERELLA DENTATA.

(Plate XVII, figs. 8-12.)

Cyrtophium dentatum, Haswell, Proc. Linn. Soc., N.S.W., Vol. IV., p. 342, pl. XXII., fig. 5. Cat. Aust. Crust., p. 272.

In this species the superior antennæ have a well-formed flagellum of six to eight articuli, and an appendage consisting of several coalescent joints; they are much smaller than the inferior pair, the flagellum of which has four segments—the last rudimentary. The propodes of the posterior gnathopods have near the base of the dactylos a conical tooth and a denticulated lobe; these are very small in specimens from Port Jackson, but much larger in specimens from Victoria; the merus, carpus and propus are densely clothed with pinnate hairs.

The females differ from the males in having the processes of the pleonal segment less prominent, the inferior antennæ shorter, and the posterior gnathopoda much smaller, with the palm of the propus unarmed. These characteristics are much more strongly marked in young females, in which the dorsal processes may be entirely absent and the inferior antennæ very little longer than the superior.

CYRTOPHIUM MINUTUM.

(Plate XVIII., figs 1-5 and fig. 9.)

Cyrtophium minutum, Haswell, Proc. Linn. Soc., N.S.W., Vol. IV., p. 343, pl. XXII., fig. 6.

In this species the antennæ are subequal, the superior pair having no appendage; the flagellum of the superior pair contains seven joints—the first four of these being cemented into one piece and the next three into another.

LÆMATOPHILUS HYSTRIX.

Cyrtophium hystrix, Haswell, Proc. Linn. Soc., N.S.W., Vol. V., p. 104, pl. VII., fig. 3.

In this remarkable little species there are only five segments in the pleon and only five pairs of appendages. The antennæ are subequal and the superior pair have no appendage.

DEXIOCERELLA LOBATA. N. sp.

(Plate XVIII., figs. 6-8.)

The first four segments are produced in the middle dorsal line into elevations which have the appearance, when looked at laterally, of rounded lobes. The superior antennæ are as long as the head and pereion; the first joint of the peduncle is straight, nearly as long as the head, the second is the longest and slender, the third is rather shorter and narrower than the second; the flagellum is a little longer than the last segment of the peduncle, five-jointed; there is a short accessory appendage; both peduncle and flagellum are ornamented with delicate hairs. The inferior antennæ are as long as the body, stout, the third joint of the peduncle is short and thick, the fourth three times as long, narrow proximally, broader distally, slightly bent; the fifth is considerably longer than the fourth and a little narrower, also slightly curved; the flagellum is about half the length of the last segment of the peduncle, consisting of three joints, the first long, the second scarcely a third of the length of the first, the last rudimentary. The anterior gnathopoda are scarcely to be distinguished from those of *C. minutum*. The posterior gnathopoda are very large, the merus produced below into a tooth-like process; the propus is large, irregularly ovoid, the greatest length not twice the greatest breadth, the palm defined by a strong tooth, with, near the base of the dactylus, a low denticulated lobe and a conical tooth. The pereiopoda are lost. The pleopoda and telson are as in *D. dentata*. The length, inclusive of antennæ, is three-tenths of an inch.

The single specimen was dredged off Broughton Islands near Port Stephens, on the coast of New South Wales.

DEXIOCERELLA LÆVIS. N. sp.

(Plate XVIII., figs. 10-12.)

None of the segments are dorsally produced. The superior antennæ are as long as the cephalon and pereion; the basal joint of the peduncle is the shortest, scarcely so long as the head; the second joint twice as long as the first; the third a little longer than the second; both the second and third joints with serrations below; the flagellum is about the length of the last segment of the peduncle, of five articuli, each ornamented below with a few slender setæ, the appendage very small, one-jointed. The inferior antennæ are longer than the superior, nearly as long as the whole body; the peduncle is very stout, the third joint shorter than the fourth and fifth; the fifth the longest, as long as the third and fourth together; the flagellum is half the length of the last joint of the peduncle, with three indistinct articulations. The second pair of gnathopods are large; the carpus is triangulate, produced below and distally into a short tooth; the propus is regularly ovate, the palm convex, minutely serrulate, with two low, minutely serrulate lobes near the base of the dactylus, defined by a pair of obscure denticles, each tipped with a strong spine, bordered laterally with two rows of setæ, each set in a minute denticle; the dactylus is three-fourths of the length of the propus. The pereiopoda are stout, with very large falciform dactyli. The length (including the antennæ) is $\frac{5}{16}$ths of an inch.

Port Molle, among sea-weed.

XIX. PROTO NOVÆ-HOLLANDIÆ.

(Plate XVIII., figs. 13-16.)

Proto Novæ Hollandiæ, Haswell, Proc. Linn. Soc., N.S.W., Vol. IV., p. 275., pl. XII., fig. 3, and "Revision of the Australian Læmodipoda," Proc. Linn. Soc., N.S.W., Vol. IX., p. 993.

The following may be added to the original description. There are only seven elongated narrow joints in the flagellum of the superior antennæ, and only three in that of the inferior pair. The propodes of the second pair of legs are greatly dilated transversely (figs. 13-15), the palm is an oval, slightly concave area along the axis of which the dactylus lies with three teeth, two lateral and one mesial, at its distal end.

EXPLANATION OF THE PLATES.

PLATE X.

Fig. 1.—Posterior gnathopod of *Talitrus sylvaticus.*
Fig. 2.—Head and antennæ of *Allorchestes crassicornis.*
Fig. 3.—Anterior gnathopod of the same.
Fig. 4.—Posterior gnathopod of the same.
Fig. 5.—" Palm " of the same appendage, more highly magnified.
Fig. 6.—Head and antennæ of *Allorchestes longicornis.*
Fig. 7.—Anterior gnathopod of the same.
Fig. 8.—Posterior gnathopod of the same.
Fig. 9.—Head and antennæ of *Allorchestes rupicola.*
Fig. 10.—Anterior gnathopod of the same.
Fig. 12.—" Palm " of the same appendage.

PLATE XI.

Fig. 1.—*Allorchestes niger*, antennæ and head.
Fig. 2.—Anterior gnathopod of the same.
Fig. 3.—Posterior gnathopod of the same.
Fig. 4.—Antennæ of *Neobule algicola.*
Fig. 5.—Anterior gnathopod of the same.
Fig. 6.—Posterior gnathopod of the same.
Fig. 7.—*Stegocephalus latus.*
Fig. 8.—Superior antennæ of the same.
Fig. 9.—Inferior antennæ of the same.
Fig. 10.—Anterior gnathopod of the same.
Fig. 11.—Posterior gnathopod of the same.
Fig. 12.—Telson of the same.

PLATE XII.

Fig. 1.—Distal end of anterior gnathopod of *Lysianassa* (*Anonyx*) *nitens.*
Fig. 2.—Dactylus and " palm " of the same.
Fig. 3.—Posterior gnathopod of *Lysianassa australiensis.*

Fig. 4.—Telson of the same.
Fig. 5.—Head of *Lysianassa affinis.*
Fig. 6.—Telson of the same.
Fig. 7.—Antennæ of *Ampelisca australis.* Variety from Port Denison.
Fig. 8.—Pereiopod of the third pair of the same.
Fig. 9.—Pereiopod of the fourth pair of the same.
Fig. 10.—Pereiopod of the fifth pair of the same.
Fig. 11.—Superior antennæ of *Ampelisca australis.* Variety from Port Jackson.
Fig. 12.—Anterior gnathopod of the same.
Fig. 13.—Posterior gnathopod of the same.
Fig. 14.—Pereiopod of the third pair of the same.
Fig. 15.—Pereiopod of the fourth pair of the same.
Fig. 16.—Pereiopod of the fifth pair of the same.

Plate XIII.

Fig. 1.—Antennæ of *Ampelisca australis.* Specimen from Port Stephens.
Fig. 2.—Extremity of pereiopod of the third pair of the same.
Fig. 3.—Basal joints of pereiopod of the fifth pair of the same.
Fig. 4.—Basal joints of third pereiopod of *Ampelisca australis.* Variety from Port Jackson.
Fig. 5.—Anterior gnathopod of *Atylus homochir.*
Fig. 6.—Posterior gnathopod of the same.
Fig. 7.—Telson of the same.
Fig. 8.—*Dexamine Miersii.*
Fig. 9.—Anterior gnathopod of the same.
Fig. 10.—Posterior gnathopod of the same.
Fig. 11.—Extremity of pereiopod of the same.
Fig. 12.—Sixth pleopod of the same.

Plate XIV.

Fig. 1.—*Eusirus dubius.* Var.
Fig. 2.—*Eusirus affinis.*
Fig. 3.—Anterior gnathopoda of the same.
Fig. 4.—Posterior gnathopoda of the same.

Plate XV.

Fig. 1.—*Megamoera suensis.* Var?
Fig. 2.—Anterior gnathopod of the same.
Fig. 3.—Posterior gnathopod of male of the same.
Fig. 4.—Posterior gnathopod of the female.
Figs. 5-12.—Various forms of the posterior gnathopod of *Mæra rubromaculata.*

Plate XVI.

Fig. 1.—Anterior gnathopod of *Xenocheira fasciata.*
Fig. 2.—Posterior gnathopod of the same.
Fig. 3.—Extremity of the pleon of the same.
Fig. 4.—End of anterior gnathopod of the same.
Fig. 5.—Posterior gnathopod of the same.
Fig. 6.—Extremity of lower antennæ of the same.
Fig. 7.—Extremity of pleon of *Haplocheira typica.*
Fig. 8.—Telson of the same.
Fig. 9.—Posterior extremity of the pleon of *Harmonia crassipes.*

Plate XVII.

Fig. 1.—Superior antennæ of *Cyrtophium parasiticum.*
Fig. 2.—Inferior antennæ of the same.
Fig. 3.—Anterior gnathopod of the same.
Fig. 4.—Posterior gnathopod of the same.
Fig. 5.—Another form of the same appendage.
Fig. 6.—Anterior gnathopod of the female.
Fig. 7.—Posterior gnathopod of the same.
Fig. 8.—Superior antenna of *Dexiocerella dentata.*
Fig. 9.—Inferior antennæ of the same.
Fig. 10.—Posterior gnathopod of male of the same.
Fig. 11.—Posterior gnathopod of female of the same.
Fig. 12.—Telson and posterior pleopods of the same.

Plate XVIII.

Fig. 1.—Superior antennæ of *Cyrtophium minutum.*
Fig. 2.—Inferior antenna of the same.
Fig. 3.—Anterior gnathopod of the same.
Fig. 4.—Posterior gnathopod of the same.
Fig. 5.—Telson and posterior pleopods of the same.
Fig. 6.—Superior antenna of *Dexiocerella lobata.*
Fig. 7.—Inferior antenna of the same.
Fig. 8.—Posterior gnathopod of the same.
Fig. 9.—Posterior gnathopod of female of *Cyrtophium minutum.* Var.
Fig. 10.—Antennæ of *Dexiocerella lævis.*
Fig. 11.—Anterior gnathopod of the same.
Fig. 12.—Posterior gnathopod of the same.
Fig. 13.—Posterior gnathopod of *Proto Novæ-Hollandiæ*, seen from the side.
Fig. 14.—Ventral view of the same.
Fig. 15.—Dorsal view of the same.
Fig. 16.—Posterior gnathopod of young specimen of the same species.

REVISION OF THE TOXOGLOSSATE MOLLUSCA OF NEW ZEALAND.

By Captain F. W. Hutton, F.G.S., &c.

In the present list I have omitted the following species as either not belonging to New Zealand or not belonging to this group of Mollusca.

Conus distans, Hwass. Inhabits New Caledonia and Polynesia.

Conus zealandicus, Hutton. Inhabits Australia. *C. aplustre* Reeve.

Drillia æmula, Angas. Inhabits New South Wales.

Lachesis sulcata, Hutton. Probably a *Columbella*.

Family Pleurotomidæ.

Pleurotoma engonia. Watson, Jour. Lin. Soc. of London, Vol. XV., p. 405 (1881).

Habitat.—Dredged by H.M.S. Challenger—N.E. of New Zealand; also at Japan.

This is rather a large species (1¼ inch in length) belonging to the subgenus *Genota*. It is keeled, without any longitudinal ribs, but with small broadish spine threads.

Pleurotoma neozelanica. E. A. Smith, Ann. Mag. of Nat. Hist., 1877, Vol. XIX., p. 492; *Drillia cheesemani*, Hutton, Jour. de Conch., 1878, p. 16.

Habitat.—Auckland.

PLEUROTOMA ALBULA. Hutton, Cat. Marine Moll. of New Zealand, Wellington, 1873, p, 12. *P. antipodum*, E. A. Smith, Ann. and Mag of Nat. Hist., 1877, Vol. XIX., p. 491.

Habitat.—Throughout New Zealand.

PLEUROTOMA ISCHNA. Watson, Jour. Lin. Soc. of London, Vol. XV., p. 403 (1881).

Habitat.—Dredged by H.M.S. Challenger, N.E. of New Zealand.

This species seems to differ from the last in being less deeply sculptured. Mr. Watson places it in the subgenus *Surcula.*

DRILLIA (?) MAORUM. E. A. Smith, Ann. and Mag. of Nat. Hist., 1877, Vol. 19, p. 497. *P. Buchanani* et *P. Trailli*, Hutton, Manual of New Zealand Mollusca, 1880, p. 42; [not *P. Buchanani*, Hutton, Cat. Tertiary Moll. of New Zealand, 1873, p. 4]. *D. Trailli*, Tryon, Man. Conch., Vol., VI., p. 206, pl. 34, fig. 90.

Habitat.—Throughout New Zealand.

This species is distinguished from *P. Buchanani* by having the suture slightly margined, and the canal shorter.

DRILLIA BULBACEA. Watson, Jour. Lin. Soc. of London, Vol. XV., p. 418 (1881).

Habitat.—Dredged by H.M.S. Challenger, N.E. of New Zealand.

Hardly, I think, to be distinguished from the last species.

DRILLIA (?) AMÆNA. E. A. Smith, Ann. and Mag. of Nat. Hist., 1884, Vol. XIV., p. 318.

Habitat.—I much doubt whether this species really inhabits New Zealand. I have never seen it.

DRILLIA NEOZELANICA. Conch. Icon. f. 143 (1843); Tryon, Man. Conch., Vol. VI., p. 184, pl. 12, f. 44 (bad). *P. rosea*, Quoy and Gaimard, Voy. Astrelabe, Zool II., p. 524, pl. 35, f. 10-11 (1833), [not of Sowerby]. *P. Quoyi*, Deshayes [not of Desmoulins].

Habitat.—Throughout New Zealand.

DRILLIA GYPSATA. Watson, Jour. Linn. Soc. of London, Vol. XV., p. 413 (1881).

Habitat.—Dredged by H.M.S. Challenger, N.E. of New Zealand.

DRILLIA LÆVIS. Hutton, Cat. Marine Moll. of New Zealand, p. 12 (1873).

Habitat—Foveaux Straits.

Much like *D. alabaster* (Reeve), but without any spinal grooves.

DRILLIA ULA, Watson, Jour. Lin. Soc. of London, Vol. XV., p. 420 (1881).

Habitat.—Dredged by H.M.S. Challenger, N.E. of New Zealand.

DRILLIA PROTENSA, Hutton (Daphnella). Trans., New Zealand Institute, Vol. XVII, p. — (1885). *D. Awamoaensis*, Hutton, Trans. New Zealand Institute, Vol. XV., p. 131; Tryon, Man. Conch., Vol. VI., p. 208, pl. 12, f. 25, [not *P. Awamoaensis*, Hutton, Cat. Tert. Moll. of N.Z., p. 4].

Habitat.—Waiwera, near Auckland.

MANGILIA GOODINGII, E. A. Smith, Ann. and Mag. Nat. Hist., (1884), Vol. 14, p. 320.

Habitat.—I much doubt whether this species inhabits New Zealand. I have never seen it.

CLATHURELLA SINCLAIRII, E. A. Smith, Ann. and Mag. Nat. Hist. (1884), Vol. 14, p. 320 (Mangilia ?); *Defranchia luteo-fasciata*, Man. New Zealand Mullusca (1880), p. 45, [not of Reeve].

Habitat.—Throughout New Zealand, and at the Chatham Islands.

DAPHNELLA LYMNEIFORMIS, Kiener, Icon. Pleurotoma, p. 62, Taf. 22, f. 3; Tryon, Man. Conch., Vol. VI., p. 300, pl. 25, f. 60; *D. cancellata*, Hutton, Jour. de Conch. (1878), p. 15.

Habitat.—Auckland. Found also in Australia.

Family. TEREBRIDÆ.

TEREBRA TRISTIS, Deshayes, Pro. Zool. Soc. (1859), p. 306; Reeve, Conch. Icon. f. 102; Tryon, Man. Conch., Vol. VII., p. 36, pl. 10, f. 100; *Acus Kirki*, Hutton, Man., New Zealand, Moll., p. 42; *Terebra antarctica*, E. A. Smith, M.S.S.

Habitat.—Throughout New Zealand; also at Japan.

NOTES AND DESCRIPTIONS OF SOME RARE PORT JACKSON FISHES.

By J. Douglas-Ogilby,

Assistant Zoologist, Australian Museum.

I offer no apology for placing before you the following original descriptions of fishes taken within the limits of Port Jackson during the last two months, because in many cases—as for instance in that of *Plectropoma nigro-rubrum*—the published descriptions available for the ordinary student are so meagre as to make the determination of the species a matter of difficulty, if not of impossibility; and because when unmistakable descriptions are given in an accessible publication, the danger of redescription under a new name is greatly reduced, and thus we may reasonably hope to keep the synonymy of our Australian fishes within proper limits.

The following descriptions have also the advantage of having been taken from newly caught examples, and are therefore more likely to be correct, both as regards the comparative measurements, and more especially the coloration, which in every case, where practicable, has been jotted down immediately on the removal of the fish from the water.

Plectropoma nigro-rubrum. Cuv. and Val.

D. 10/18. A. 3/8. V. 1/5. P. 13. L. lat. 65. L. trans. 4/21. Cœc. Pyl. 8.

Length of head $2\frac{3}{4}$, of caudal fin $5\frac{2}{3}$, height of body $3\frac{3}{5}$ in the total length. Diameter of eye $\frac{1}{6}$ of the length of head; interorbital space $\frac{2}{5}$ of diameter of eye. Hinder limb of præoperculum emarginate, serrated, the denticulations in the notch stronger than those at either side; those at the angle small. Two spines on the lower limb, of equal size, and distant one from the other. Two flattened opercular spines, of which the upper is the larger. The posterior extremity of the maxillary extends to beneath the hinder margin of the orbit. Lower jaw the longer; it has three pairs of canines at its front angles, two pairs behind; upper jaw with two pairs on the angles of inter-maxillary; they but little exceed the ordinary teeth in length. Dorsal spines a little lower than the rays, increasing in length to the fourth, which is the longest, $\frac{2}{5}$ of the body below it; the fin is deeply notched, the last spine being its own length shorter than the first ray. Second anal spine very strong, $\frac{2}{3}$ of the longest ray, and $\frac{3}{8}$ of the body above it. Caudal slightly rounded.

Colors red; four broad black transverse bands on the body; the first commencing between the fifth and seventh dorsal spines, and terminating a short distance in front of the vent; the second between the anterior rays of the soft dorsal and anal; the third from the last dorsal rays to immediately behind the anal; and the fourth in front of the base of the caudal: the bands are of equal breadth with the interspaces. The head and nape are suffused with dusky blotches, which almost form an irregular longitudinal band on the occiput. The soft posterior lobe of the operculum broadly margined with gold. Fins bright scarlet, all except the ventrals blotched with dull yellow.

Our specimen which measures a little more than 10 inches, is a female, and has the ova, which are small and numerous, in a forward stage of development. The stomach contained the partially digested remains of an *Atherina*. It was caught in Port Jackson on the 20th of February.

With regard to the determination of our example as the "*Plectropome rouge et noir*" of Cuvier and Valenciennes, it should be noticed that these authors mention 5 bands on the sides, as also do Quoy and Gaimard, who figure their specimen in the "Voyage de l'Astrolabe"; nor does either figure or description shew anything of the dark markings on the head, so conspicuous in our form; and in addition to these distinctions in color, the spines on the lower limb of the præoperculum are differently situated, and we have also an extra ray in the dorsal. The examples described by the authors quoted above having been obtained in Western Australia, it is probable that this form now under consideration is an eastern representative, which, should the differences in form, color and locality prove constant, would have to be raised to the rank of a local race or subspecies. A specimen in the Macleay Museum appears to agree with ours.

Early in the month I obtained by the trawl a fine example of *Callionymus calcaratus*, Macleay, and having had an opportunity of examining the type specimens, I wish to correct a typographical error which has crept into the original description, and is likely to create difficulty in future. Mr. Macleay says, speaking of the præopercular spine, "strong, flat, with a strong spur on the *posterior* half of the outer side pointing *backwards*, and three on the inner side pointing inwards and *backwards*" (1). I find that the spine is bent inwards at the tip, and armed on the inside with three, sometimes four, additional spinules, all of which are directed *forwards* as also is a stout straight spinule, which springs from the outside angle of the spine in its *anterior* half; it is not nearly so long as the diameter of the eye; the anal is pure white, both rays and webs. My fish measures $8\frac{3}{4}$ inches, which is much longer than any of the type specimens.

On the 13th ultimo we obtained in the trawl up Middle Harbour a magnificent *Ammotretis*, a genus of which very few individual examples are known; as the lateral line is distinctly curved this cannot be Dr. Gunther's species from Tasmania, from which it also differs in its greater depth, smaller head and longer snout. It is probable that the species described by Mr. Macleay as *A. zonatus* is identical with our fish, the banded appearance, which induced him to give it the specific name, having been caused by contact, when dying, with some foreign substance, and as the name "*zonatus*" is unsuitable and misleading, I would suggest that this fine species should be re-named *Macleayi* in honour of our distinguished Secretary, on whose fête-day it was obtained, and who originally described it. The following is a description of the specimen, which measured $10\frac{1}{3}$ inches.

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(1) In my specimen, and in one of Mr. Macleay's types, there are three inner spinules on one side and four on the other.

AMMOTRETIS MACLEAYI.

D. 80. A. 50. P. 12. V. dext. 7, sin. 4. L. lat. 87.

Length of head $4\frac{1}{3}$, depth of body $1\frac{9}{10}$ in the total length. Eyes on the same level, divided by a narrow scaly space $\frac{1}{3}$ of their diameter, which is $4\frac{3}{7}$ in the length of head, and $\frac{2}{3}$ of the snout. The maxillary ends some distance in front of the eye. Teeth in villiform bands on the blind side only. Dorsal fin commences on the tip of the rostral appendage, and is not continued to the base of the caudal: the longest rays are behind the middle of the fin, opposite and equal to the longest anal rays and scarcely $\frac{1}{4}$ of the body below them. The anterior rays are almost free. The base of the left ventral is only $\frac{1}{7}$ of that of the right, which is continuous with the anal. Pectorals of equal dimensions. Caudal slightly rounded, equal to the length of the head. Scales ctenoid, covering the entire head and extending up the fin rays. Lateral line with a decided, though slight, curve above the pectoral fin.

Rich olive brown, with a few indistinct darker blotches. White beneath, tip of left ventral black.

On the 13th of last month we received from Inspector Seymour an *Exocœtus* taken in the neighbourhood of the harbour. It belongs to the division in which the ventral fins extend beyond the origin of the anal, and which is without the central barbel at the symphisis of the lower jaw, and is closely allied to the *Exocœtus speculiger* of Cuv. and Val., from which it differs in the point of origin of the anal fin. It differs from *nigricans*, to which also it is closely allied, in the position of the ventrals, number of dorsal and anal rays, and pattern of coloration. The example is a male, with the milt very slightly developed, and measures $15\frac{1}{4}$ inches. I propose to call this species *melanocercus* in reference to the black caudal.

EXOCŒTUS MELANOCERCUS. Nov. sp.

D. 13. A. 11. V. 6. P. 14.

Length of head 6, of caudal fin 4, height of body $8\frac{4}{9}$ in the total length. Diameter of eye equal to snout, $\frac{6}{7}$ of interorbital space which is concave, and $\frac{3}{10}$ of the head. Greatest height of head equals its length anterior to hind margin of orbit. Upper surface of head flattened, as is also that of the body, almost as far as the dorsal fin. Snout obtuse ; lower jaw slightly the longer. Maxillary almost hidden by præorbital when the mouth is closed. Teeth in the jaw minute, in villiform bands. Anterior dorsal rays $\frac{3}{5}$ of the length of the head. Anal fin commences opposite the middle of the dorsal. Pectorals, which are $1\frac{5}{7}$ in total length, all but extend to the rudimentary rays of the caudal. The ventrals are inserted considerably nearer to the root of the caudal than to the hinder margin of the orbit, and reach almost to the end of the base of the anal ; they are $\frac{1}{4}$ of the total length, $1\frac{1}{2}$ of that of the head, and equal to the lower lobe of the caudal which is much the longer There are about 30 series of scales between the occiput and the dorsal fins, and 7 between the origin of the dorsal and the lateral line.

Dark steel blue above, becoming lighter on the sides and beneath ; inferior caudal portion of the body, opercular and mandibulary regions silvery ; abdominal region grey, with the margins of the scales darker. Dorsal and pectoral fins dusky, the latter with a large white blotch at its base inferiorly. Ventrals with the central rays dark ; anal white ; caudal black.

NOTES AND EXHIBITS.

Mr. Ratte exhibited a Jaw Bone of a Devonian Fish from New South Wales, probably *Asterolepis*, (Australian Museum as well as the following :)—A Silicified Fossil Shell, apparently allied to *Worthenia*. A Detached Siphon of an *Orthoceras*. There is some doubt about this specimen, as it resembles very much the rare sub-genus *Endoceras*, which however, is a lower silurian fossil, whilst the fossil exhibited comes from the same limestone beds as *Asterolepis*, and is therefore Devonian. He also exhibited drawings of the above specimens, of the large *Crioceras Australe* (Chas. Moore), from the Neocomian of Northern Queensland, a sketch of its Septa, and Drawings of two Species of *Sanguinolites* (?) from New Caledonia, probably Carboniferous. (From the collection of Rev. F. Monrouzier, Noumea. Casts in the Australian Museum.)

Dr. R. von Lendenfeld exhibited two Rock Specimens from the Australian Alps. One formed part of the summit of Mount Kosciusco, and the other was taken from the summit rocks of Mount Townsend, the highest mountain in Australia. The former is a very coarse grained dark colored granite, the latter possesses the appearance of gneiss ; although it is also granite of a very light colour.

Dr. R. von Lendenfeld also exhibited specimens of Cypress Pine, (*Frenela robusta*), which had been affected by the larva of *Diadoxus erythrurus*. Extensive tracts of pine scrub have been devastated by this insect, which may thus render great services to the settlers in the back country. A living specimen of the larva, a grub an inch and a half long, was also exhibited.

Mr. Ogilby exhibited the Fishes referred to in his paper.

Mr. E. P. Ramsay exhibited the following rare birds :—*Scenopeus dentirostris*, Ramsay, and a new sp. of *Collyriocincla*, obtained by Mr. Boyer Bower at Cairns, Queensland ; also a fine specimen of *Lophorina superba* from the Astrolabe Ranges, in New Guinea.

Also the anterior portion of the skull containing the premaxillaries and two front incisors complete of a new extinct marsupial, allied to the wombat, but quite distinct from the genus *Phascolomys*. The portion exhibited indicated an animal at least twice the size of any known fossil or recent species. The two upper incisors are worn away in a similar oblique manner to that exhibited in the new genus *Sceparnodon*.

Mr. Ramsay read the following letter from Sir Richard Owen:—

"SHEEN LODGE, RICHMOND PARK, EAST SHEEN, SURREY,
26th December 1884.

"MY DEAR RAMSAY,

"Your letter of December 1st, 1884, with the photographs of your grand old marsupial carnivore of the Wellington Caves, was very welcome'; especially so would be any skeletal indication of the affinities of your *Sceparnodon*, of which I hope you have received a copy, together with those of my last investigations of the generative economy of the Monotremes. I had furnished the notes and drawings of the larger uterine ova of *Echidna*, received subsequently to the smaller ones, early in 1883; but the closing labours of Nat. Hist. Museum in that year, led to the postponement of publication until the result of Caldwell's researches were flashed over to us. And what a subject of cogitation is the egg-laying of milk-giving mammals, bodily represented by our hedgehogs and otters at home! What pains and arrangements are taken by the *feathered* warm-blooded kinds to ensure safe hatching of these eggs!! One really shall want satisfactory proof of a like provision by *Platypus* of securing the requisite heat for the evolution of the embryo in its excluded eggs. (1) It may be an easier matter for the more terrestrial spiny monotreme. I suppose a series of the "Philosophical Transactions of the Royal Society" may exist in Sydney. In 1832 Geoffroy St. Hilaire had a majority in favour of the abdominal sub-cutaneous glands *not* being *milk-producers*; the paper in the Phil. Trans. of that year, p. 537, was accepted as proof of Meckel's opinion; and that led to the inference of the viviparity, or at any rate ovo-viviparity of such sucklers. The subsequent discovery of intra-uterine development in the kangaroo, *minus* placental attachment, and *plus* premature birth or transfer to the pouch, weighed further in support of the hypothesis that the Monotremes might be ova-vivaparous in some such fashion.

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(1) Baron Maclay's recent experiments show the heat of *Platypus* to be from 24° ·5 C. to 25° 2 C., and that of *Echidna* averaging 28° C. (82° ·4 F.), —E. P. R.

"However when I got the female *Echidna* with an ovum in each uterus enlarged to the size shewn in my last paper, but with no such advance of embryonal development as I had deemed possible in the case of the smaller *ova*, I regarded the question as settled, and was much gratified to learn that eggs had been found in the nest by so skilled an observer as Caldwell.

"I send with pleasure by the same post which takes this a copy of *Sceparnodon*. I know of no extinct Australian form, of which a skeleton, or any instructive part of the dental series, or of the osteology, would be more acceptable than of your *Sceparnodon*.

"You can communicate any matter referred to in this letter to our Associates in the Royal and Linnean Societies of Sydney.

"Believe me, with every good wish,

"Sincerely yours,

"RICHARD OWEN."

Mr. Pedley exhibited a Fungus occurring on the leaves of the peach trees over the district extending from Prospect to Camden. It is of the order Ascomycetes, and lodges exclusively on the lower side of the leaf, the mycelium choking up the stomata, and thus destroying the vitality of the plant.

Mr. Edelfelt exhibited a bag formed of fibre obtained from a species of *Morus* (?) by the natives of New Guinea near the Owen Stanley Range, and described the mode of its preparation.

WEDNESDAY, 29TH APRIL, 1885.

Dr. James C. Cox, F.L.S., Vice-President, in the chair.

MEMBERS ELECTED.

The Rev. George Brown, Darlinghurst; W. J. Weston, Esq., "Orielton," Woollahra; T. H. Bowyer Bower, Esq., 21 Collingham Road, S. Kensington, London.

DONATIONS.

"Papers and Proceedings of the Royal Society of Tasmania," 1884. From the Society.

"Remarks on a small collection of Clavicorn Coleoptera, from Borneo, with description of new Species." "Notes on the life history of *Porphyraspis tristis*, a palm-infesting Cassida, from Brazil." "Description of two new species of *Nitidulidæ*, from Sumatra." "New Species of the Genus *Zephronia*, from Borneo." "Description of an African Coleopterous genus *Helota*, Macleay." "Additional notes on the Genus *Helota*, Macleay." "Description of two larvæ, and new genera, and species of Clavicorn Coleoptera." From the Author, A. Sidney Olliff, Esq.

"Journal of the Royal Microscopical Society," London. Vol. V., Part I. From the Society.

"Recherches sur l'évolution des Araignées," Claparéde. "Beobachtungen über Anatomie und Entwicklungsgeschichte Wirbelloser Thiere," Claparéde. From William Macleay, F.L.S., &c.

"Transactions, Proceedings, and Report of the Royal Society of S. Australia." Vol. VII., 1884. From the Society.

"Report of the Auckland Institute and Museum for 1884." From the Directors.

"Zoologischer Anzeiger." Nos. 188, 189, 190. 1885. From the Editor.

"Bulletin de la Société d'études scientifiques d'Angers." 1st. and 2nd Fascicules, 1880. From the Society.

"Journal of the New York Microscopical Society." Vol. I., No. 2, February, 1885. From the Society.

"Science." Vol. V., Nos. 106-109. From the Editor.

"Annual Report of the Historical and Scientific Society of Manitoba, 1884;" also Parts 12-18. From the Society.

"Proceedings of the Geographical Society of Australasia." 1st. Session, 1883-4, Vol. I. From the Society.

"Mémoires de l'Académie Impériale des Sciences de St. Pétersburg." Tome XXXI., Nos. 15 and 16; Tome XXXII., Nos. 1, 2 and 3. From the Director.

"Journal of the Cincinnati Society of Natural History." Vol. VII., No. 3. From the Society.

"Bijdragen Tot de Dierkunde." Vol. XI., Part 2. "Die Bryozoen," by Dr. W. J. Vigelius. From la Société Royale de Zoologie, Amsterdam.

"Bulletin of the Museum of Comparative Zoology." Cambridge, Mass. Geographical Series. Vol. VII., Nos. 2-8 and 11. From the Curator.

"Proceedings of the Boston Society of Natural History." Vol. XXII., Parts II. and III. From the Society.

"Victorian Naturalist." Vol. 1., Nos. 15 and 16. From the Field Naturalists' Club of Victoria.

"Transactions of the Entomological Society of London." Part V., 1884.

"Meddelanden af Societas pro Fauna et Flora Fennica." 9th and 10th Häftet, 1883. From the Society.

"Monatliche Mittheilungen des Naturwissenschaftlichen Vereins des Regierungsbezirkes Frankfurt." Jahrg II., Nos., 10 and 11. From the Society.

"Closure of the Cyclostomatous Bryozoa." From Arthur W. Waters, F.L.S., F.G.S.

"Catalogue of the Library of the Royal Society of Tasmania." From the Society.

"Annales de la Société Royale Malacologique de Belgique." Tome XVIII., 1883. From the Society.

PAPERS READ.

REVISION OF THE GENUS *LAMPRIMA* OF LATREILLE, WITH DESCRIPTIONS OF NEW SPECIES.

By William Macleay, F.L.S., &c.

Mr. C. French of the Botanical Museum of Melbourne, sent me very recently a very beautiful Pecticorn Insect which he had received from North Australia. The section of the Lucanidæ to which this fine Insect belongs,—the Subfamily Lamprimidæ— is almost peculiar to the Australian Region as defined by Wallace, indeed the only exception to its entirely Australian character, is in the case of the genus *Streptocerus*, which is Chilian, and is not by any means the only instance in which affinities have been found between the Fauna of South America and Australia.

The chief characters which distinguish the Lamprimidæ from the other Sub-families of the Lucanidæ, are the narrow prosternum, only showing between the fore legs in a narrow keel, and the large and exserted mandibles of the males, which are however, never so largely produced as in the kindred American genus *Chasiognathus*.

With the exception of *Streptocerus*—the only foreign genus, the genera of the Sub-family, are four, viz., *Dendroblax*, represented by one species from New Zealand. *Rhyssonotus*, consisting of three species,—*nebulosus* Kirby, found in New South Wales and

Queensland,—*jugularis* Westw. from Victoria, and *parallelus* Deyr. from Queensland. *Cacostoma* one species,—*squamosus* Newm., from Queensland, and *Lamprima* a genus rather numerously represented in all parts of Australia.

It is to this last genus that the superb insect sent me by Mr. French belongs, and before proceeding to describe and name it and some other species of the genus in my collection, I shall take the opportunity of making some general remarks on the present state of our knowledge of all the species comprised in the genus. The genus itself, remarkable for the metallic brilliancy of its colouring, is sufficiently well defined, but the species are most difficult of definition, and much confusion has consequently arisen in their identification and nomenclature. I shall therefore briefly notice all the species hitherto described, not to redescribe them, but to point out the characters which seem to me most suitable and available for noting specific differences.

LAMPRIMA ÆNEA. Fab.

This species was first described by Fabricius in 1801 in his "Systema Eleutheratorum" under the name of *Lethrus æneus*. A few years afterwards it was described by Schreibers in the 6th Volume of the Transactions of the Linnean Society of London, under the name of *Lucanus aeneus*; and in 1807, Latreille in his "Genera Crustaceorum et Insectorum" made for its reception the genus *Lamprima*. The species has also been described in the writings of W. S. Macleay, Burmeister and Reiche. In Gemminger and Harrolds "Catalogus Coleopterorum" *Lamprima cuprea* Latreilla, with the habitat of Sydney, is given as a synonym of the female of *L. aenea* and *Lamprina viridis* Erichson from Tasmania is placed as a variety of *L aenea.*

I believe this to be a mistake. I am confident that *L. aenea* is an inhabitant of Norfolk Island only, and I have good reason to believe that Latreille's *L. cuprea* is the female of *L. aurata*, Latr., and that Erichson's *L. viridis* is another species or a variety of one of the other species. *L. aenea* can be readily distinguished from all the other known species by its rugose sculpture, dense puncturation, very slightly angled thorax, short mandibles, and the acute, narrow, terminal spur of the fore tibiæ in the male. No reliable distinction can be derived from the colour; the prevailing one is brilliant golden-green, but coppery-green, dark bronze, and even blue are occasionally seen. The female is, as in all of this genus, more deeply punctured than the male.

LAMPRIMA AURATA. Latreille.

Nouv. Dict. Hist. Nat., XVII., p. 278.

This species comes next to *L. aenea* in priority of description. It is well described by W. S. Macleay in the "Horæ Entomologicæ." It seems to have been taken for *L. aenea* by Donovan, Guerin and Castelnau, and is no doubt the *L. fulgida* of Boisduval, Burmeister, and Dupont. The female is the *L. cuprea* Latreille. The exact habitat of this species is not known to me. I find in the old Macleay collection two males and three females but without locality, while among all the more recent collections of Coleoptera which I have had from all parts of the country, I have only one specimen, and that is labelled "Darling River."

In general appearance the resemblance to *L. Latreillei* is very great. Both are of a brilliant golden-green, with a coppery effulgence on the head, but as a rule the colour is more golden and less green than in *Latreillei*, but the true specific differences between the two are to be found in the more punctured thorax, and slightly rugose elytra, the short, obtuse pointed mesosternum, and the less numerously and regularly dentated fore tibiæ. The tibial spur of the male is very broadly scuriform or almost fan shaped, thereby differing much from *L. aenea*.

The females are generally of a reddish copper colour, and densely punctured.

Lamprima Latreillei. Macleay.

This is the best known and most common species in New South Wales. It was first described by W. S. Macleay in the year 1819 in the "Horæ Entomologicæ." It has been described also by Burmeister and Erichson. In Gemminger and Harrolds Catalogue, *L. aenea* of Boisduval, *L. amplicollis* of Thomson, var. *L. coerulea* of Donovan, and *L. pygmæa*, of W. S. Macleay are placed as synonyms of this species, and not having seen the types, I cannot dispute the statement. It is altogether a smoother and more sericeous insect than *L. aurata*, and differs besides in the more densely punctate breast, the highly keeled prosterrum, and the prominent and acutely angled mesosternal point. The females of this and the preceding species are much alike, but they show the same mesosternal differences as the other sex. The species is found in Victoria and Qusensland as well as New South Wales. I have lately received from the Herbert River District of Queensland some specimens of a *Lamprima*, which I felt strongly tempted to look upon as a species, and in fact I had at one time described it under the name of *L. sericea*. It differs a little from *L. Latreillei* in the armature of the fore tibiæ, the smaller size, the duller coloration, and the slightly less acute mesosternal point, but I do not think that, for the present at all events, it can be considered as more than a mere variety of *L. Latreillei*, and as such I have named it in my cabinet.

These three species were all that were known for many years, and they have been confounded one with another in the most inexplicable way, indeed Reiche asserts, in the "Revue Entomologique" so late as the year 1841, his belief that *L. aurata* and *Latreillei* are mere varieties of *L. aenea*. It is of course evident that M. Reiche had never seen true specimens of these insects when he made such an assertion.

Lamprima Micardi. Reiche.

This is the next species in seniority. It was described by Reiche in 1841 in the Revue Zoologique of that year. Gemminger and

Harrold in their Catalogue make *L. varians* of Germar a synonym of this species, which is certainly a mistake. It is smaller than *L. Latreillei*, and of a more coppery colour, the mesosternal point is blunt, and the spur on the fore tibiæ of the male is spiniform and narrow.

The habitat is West Australia.

LAMPRIMA VARIANS. Germar.

This species seems to have been described by Germar and Burmeister in the same year, by the one in the Linn. Ent. III., p. 895, and by the other in Burmeister's Lamellicornia, Handbuk, Band 5, p. 415 and 417. It is, I think, without doubt, identical with the *L. cultridens* of Burm., a species which has been for some time, on the authority of Major Parry, placed as a synonym of *L. Micardi*. The spur on the fore tibiæ of the male in *L. varians* is very much narrower than in most of the species, but much broader than in *L. Micardi*, and in this respect it answers to Burmeister's description of *L. cultridens*, which is "*calcare maris antico angusto trigono, sulfalciformi*," while of *L. Micardi* he says "*calcare maris antico angustissimo, laevi.*" It is the most common species in South Australia and is also found in West Australia.

LAMPRIMA SPLENDENS. Erichs.

Erichson described this species in 1842, in a note to his paper on the Insects of Tasmania, published in the Archiv. fur Naturg. His description is very poor, and is taken from a female specimen. No locality is given, but I have specimens of what I have no doubt is this insect from the Clarence River in New South Wales, and from Rockhampton in Queensland.

It is, I think, a good species. It is altogether of smaller dimensions than *L. Latreillei*. The male seems to be invariably of a very brilliant golden green, with the head of a fiery copper, and the maxillæ, palpi, antennæ, tarsi and tibial spur, picous. The puncturation of the thorax and elytra resembles that of *L. Latreillei*. The mandables have on the upper surface a very large indentation, and terminate in three teeth, the extreme two small and close together; a deep notch and tooth on the inner surface above the middle. The prosternum terminates in a short pointed triangle between the fore legs, and does not show a long narrow keel like *L. Latreillei*; the triangular space on the breast on each side is small, sunken, and strongly punctate. The mesosternal point is rectangular and clothed in front with yellowish pile. The whole under surface is densely punctate and sparingly pilose. The anterior tibiæ are armed externally with five teeth, the uppermost reaching the middle; the spur on the inner apex is broadly securiform, the middle and hind tibiæ are slender and unarmed. The female is generally of a coppery hue, very brilliant, but densely punctured all over; the tibiæ are all strongly armed. Major Parry makes it a synonym of *L. aurata*, but if I am right in the recognition of the species it is manifestly distinct.

Lamprima rutilans. Erichs.

Archiv. fur Naturg, 1842, I., p. 170.

Erichson described this species in his Tasmanian Insects (loc. cit), but it is also a common species in Victoria, and in some parts of New South Wales. It is generally of a tarnished golden hue, is more puncate than *L. Latreillei*, with mandibles more broadly truncate and recurved at the apex, and the mesosternal point sharply rectangular. Major Parry thinks this is also the same as *L. aurata*. I believe it to be a good species.

Lamprima Kreftii. Macleay.

Proc. Linn. Soc., N.S Wales, Vol. IV., p. 173.

I described this species in 1871, in my paper on "The Insects of Gayndah" (loc. cit.) The only specimen known—a male—is in the Australian Museum. In addition to the distinctive characters mentioned by me in the original description, I would add the following—the mesosternal point acutangular as in *L. Latreillei*, and the teeth on the outer side of the fore tibiæ small and irregular above and on the middle.

Two other species of *Lamprima* are admitted as species in the "Catalogus Coleopterorum," *L. nigricollis* and *L. sumptuosa*, both described by the Rev. F. W. Hope in the year 1845, in a list of Lucanidæ published by him in London, in pamphlet form. The Rev. gentleman seems in that publication to have bestowed names of his own on about all the species of *Lamprima* known, thus we find by Gemminger and Harrold's Catalogue that he calls *L. ænea—subrugosa, L. aurata—Schreibersii, L. Lotreillei—Tasmaniæ,* *and L. Micardi—purpurascens.* Of course this pamphlet is now out of print and cannot be referred to, even if it were worth the trouble. But this fact evinces the folly of publishing in a separate form, instead of in the transactions of some established Scientific Society, any paper containing original matter, or matter useful for future reference. Catalogues of Museums, public or private, or hand lists of collections of any kind, are necessarily ephemeral productions, and have no chance of a lengthened existence, unless as a part of a Society's proceedings.

The two species mentioned have, after close inspection of the types, been ascertained by Major Parry, to be both mere colour varieties of *L. Micardi*, Reiche.

I shall now proceed to describe some hitherto unnoticed species of *Lamprima*, beginning with the superb insect sent me by Mr. French, the description of which is in truth the original incentive for the present paper.

Mr. French has specially asked me to dedicate the species to the illustrious Botanist, Baron Sir Ferd. von Mueller, and it gives me much pleasure to comply with the request.

LAMPRIMA MUELLERI. n. sp.

Female. Golden-green, nitid. The head small, transverse, very nitid, excavated and deeply punctured in front between the eyes; the clypeus and labrum vertical, elongate, of a blackish colour, and strongly punctate; the mandibles also black, longer than the head, strong, with a broad, punctured, slightly excavated space above and punctate beneath, with a strong prominent horn projecting downwards on each side of the labrum. The palpi are normal. The maxillæ and labium are enveloped in yellow hair, but do not appear to be at all corneous. The mentam is of a metallic green, strongly punctate, and of a transverse triangular form. The thorax is quadrangular, a little broader than the length, a little narrower at the apex than at the base, bisinuate on both, a rounded angular dilatation with a depression on the sides behind the middle, the entire lateral margin crenulated with about fifteen short, strong, blunt teeth, and a number of small dense punctures in the median line. The colour of the thorax is of a deader metallic hue than the rest of the body. The scutellum is of a rounded triangular form, with a few small punctures. The elytra are more than twice the length of the thorax, about the width, at the base, of the thorax and narrowing a little to the apex; the colour is very brilliant, the greenish-gold of the sides changing into a coppery hue in the middle. Each elytron has a very distinct sub-apical callus, and is marked by a number of large shallow variolose punctures, disposed thinly in irregular rows, with densely punctate recurved margins. The under surface is of the same colour and brilliancy as the upper. The prosternum shows in a narrow keel between the fore legs, the mesosternum is shortly pointed and concave on its anterior face; these with the metasternum and sides of the abdominal segments are clothed with a yellowish pubescence. The thighs are of the colour of the body, and of moderate size; the tibiæ and tarsi are black or piceous-black; the fore tibiæ are broad and armed externally with seven teeth; the other tibiæ have two teeth near the middle on the outer side; the tarsi are rather shorter than the tibiæ.

Length, 17 lines.

Hab.—North Australia.

This large and beautiful species might well form the type of a new genus; the triangular mentum, strongly crenulated thorax; and entirely peculiar puncturation of the elytra, seem to constitute almost generic characters. But in the absence of a male specimen, which may probably prove to be still more peculiar, it would be premature to attempt to make a genus for its reception.

LAMPRIMA INSULARIS. n. sp.

Male. Brilliant golden green all over, excepting the antennæ, palpi and tarsi which are piceous. The mandibles are nearly straight above, and terminate in a slightly truncate point, the tooth and notch of the under side are strong. The head is strongly punctate. The thorax is of the usual form, and finely but not densely punctured. The scutellum is smooth. The elytra are finely but rather thinly punctured, are marked with some light striæ near the suture and are slightly rugose. The mesosternal process is very strong and prominent.

The under surface is more densely punctured than the upper, and is clothed with yellowish pile. The fore tibiæ are armed externally with six teeth not reaching above the middle, the spur on the inner apex is large and fan-shaped.

The female only differs from the male in having the mandibles *very* short, the puncturation of the body much stronger, the colour a dark copper-green, and in having ten teeth or serrations on the outer edge of the fore tibiæ.

Length, ♂ 12 lines, ♀ 9 lines.

Hab.—Lord Howe Island.

LAMPRIMA NIGRIPENNIS. n. sp.

Male. The thorax, the legs except the tarsi, the scutellum, and the under surface are metallic bluish-green ; the head coppery, and the elytra blackish-brown and without metallic lustre. The mandibles are deeply emarginate on the upper surface, with a strong tooth immediately in front of the excavation ; they are truncate or nearly so at the apex. The triangular depression on the head is deep, punctured, the punctures becoming coarser on the lateral dilatations. The scutellum is smooth, rounded and transverse.

The elytra are quite smooth. The prosternal keel is distinct ; the mesosternal point is strong, prominent, and rectangular. The fore tibiæ are armed externally with six strong obtuse teeth, the inner terminal spur is broadly securiform.

Length, 14 lines.

Hab. Australia.

This is an unique insect in the old Macleayan collection, labelled "New Holland," and with no other indication of locality.

LAMPRIMA VIOLACEA. n. sp.

Male. Thorax and elytra deep violet-blue with a greenish tinge on the margins, the first of these is very finely and distantly punctured, the other has a few obsoletely punctured striæ near the suture. The scutellum is of a rounded triangular form, with a few indistinct punctures on the base. The under surface and legs are of a very brilliant golden-green. The antennæ, palpi and tarsi are piceous. The mandibles are long and slender, slightly diverging, not or only a little bearded on the inside, and terminate in two teeth or angles with a slight emargination between them. The triangular excavation on the head, which is of a dull bronze colour, is more finely punctured than is usual in the genus. The spur of the fore tibiæ is strongly securiform ; the teeth on the outer side are five in number, and do not reach above the middle. The mesosternum is strongly pointed, the anterior face is quite vertical.

The female differs from the male in being larger, of a greenish colour, and much more punctate.

Length (mand. incl.) ♂ 10 lines ♀ 10 lines.

A male and female of this remarkable species were taken at Botany Bay, many years ago by Mr. Masters, and are now in that gentleman's collection.

I have never seen another specimen anywhere.

LAMPRINA MINIMA. n. sp.

Male. The upper surface is of a rather dull bronze, the under surface and legs are of a pale piceous red. The mandibles are very short (shorter than the head) stout, scarcely notched and toothed below and bidentate (almost truncate) above.

The head which has a copper-red tinge, is very strongly punctate, its triangular depression is very shallow. The thorax is distinctly but not densely punctate, and has a round depression in the middle on each side of the median line, this line is visible only near the base. The scutellum is transversely rounded, with a small depression near the apex. The elytra are very faintly punctate and striate, and leave the pygidium exposed. The fore tibiæ are armed externally with five teeth, the spur on the inner apex is only slightly securiform, being very much narrower than in many of the genus; the mesosternal point is obtuse and not prominent.

Length, 6 lines.

One specimen (a male) is all I have ever seen of this species. I received it some years ago in a collection from South Australia.

In the Annales Musco civico of Genoa for the year 1875, p. 999, Dr. Gestro describes under the name of *Neolamprima* a genus differing only from *Lamprima* in the very remarkable form of the mandibles of the male. The species on which he forms the genus is from Arfak on the North-west part of New Guinea and he names it *Neolamprina Adolphinae* I have lately received from the Herbert District, Queensland, a specimen of the genus, and I think a distinct species.

NEOLAMPRINA MANDIBULARIS. n. sp.

Male. In colour and form of body much like *Lamprima aurata*. The thorax very thinly and minutely punctured, the elytra smooth. The mandibles are very long, (more than half the length of the insect) slightly narrower in the middle than at the base, widening again a little at the apex, which is tridentate, without notch or tooth on the upper surface, curving upwards from the middle, densely bearded on the inner surface, and serrated on the lower edge from a little below the middle to the apex; the teeth forming the serration being regular, truncate—resembling the cogs of a wheel—and eight in number. The mesosternum is acutely pointed. The fore tibiæ are strongly six-toothed on the outer side, the inner spur is strongly securiform.

Length, without mandibles 10 lines.

Hab.—Herbert River District, Queensland.

Judging from the figure accompanying Dr. Gestro's description of the New Guinea species, the serrations of the mandibles commence near their base and are more numerous than in the present species. I have a female from the same locality but whether it is the female of this species or of a *Lamprima* it is impossible to say, it would do for either. It is small—about 7 lines in length—has very short mandibles, and is entirely of a bluish-black colour, densely punctate and rugose. The under surface is brassy. The mesosternal point is strong and rather acute.

NOTES ON ZOOLOGY OF THE MACLAY-COAST IN NEW GUINEA.

II. (1)

By N. de Miklouho-Maclay.

On a New Species of Macropus: Macropus tibol.

(Plate XIX.)

The only kangaroo, which came into my hands during my stay at the Maclay-Coast, was a small *Macropus*, which I now describe as *Macropus tibol*, keeping as a name for the species the name under which the animal is known amongst the natives (2). *Macropus tibol* appears to be very scarce on that coast; during my prolonged stay there, I succeeded in obtaining only *two* specimens of it—one, shot by myself in the forest in 1872 and the second, brought to me in 1876, by a native whose dog discovered and killed it in the dense scrub not far from the beach. Both were adult males and of about the same size. (3)

The *principal measurements* taken the same day on which I obtained the second specimen in 1876, (a young ♂), were the following:—

From the tip of the nose to the base of the tail		330 mm.		13 in.
Length of the tail		235 mm.		9,3
From the tip of the nose to the occiput		88 mm.	or about	3,5
Fore limb	about	121 mm.		4,8
Hind limb	about	238 mm.		9,3
From the head to the end of the tail of the 4th toe ...		119 mm.		4,7
Length of the ear		34 mm.		1,4
Circumference of the base of the tail	about	50 mm.		2,0
From knee to knee over the back	about	260 mm.		10,3

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(1) The *first* "Note on Zoology of the Maclay-Coast" has been published in Proceed. Lin. Soc. of N.S.W., Vol. IX., Part, 3, p. 713.

(2) I mean the natives speaking the dialect of Bongu.

(3) Another proof of the scarcity of this animal is the fact, that amongst the bone implements used by the natives (who, before my arrival at the Maclay-Coast in 1871 were not acquainted with the use of any metal) only very few indeed were made of bones of *M. tibol*.

Colour and character of the fur.—The general colour chocolate brown, dulled browner at the base ; fur close, soft to the touch ; the head and down the back, the arms and legs of a deeper chocolate tint, inclining to reddish on the feet and hands. Chin, throat, and under surface, the inner parts of the flanks, ashy. Beginning at the knee and extending in the direction of the femur towards the base of the tail is noticeable an indistinct oblique stripe of a lighter tint. On the face examined from the side, a narrow line of a light tint is also perceivable, which runs from below the nostril along the upper lip to below the orbit. A narrow line of paler hair on the inner margins of the ears. Hair on the limbs shorter and stiffer. Tail with short soft hair above, with very short hair almost bare below.

The general habitus of the body resembles in many respects the smaller kind of Macropi, known in Australia under the vulgar name of "*Pademelons.*"

The examination of fig. 2 (representing the head of the animal in profile and natural size), and of fig. 3 (showing the muzzle from the front), will give a better idea of the muzzle, divided in the middle, the distribution of the conspicuous hair, the size of the eyes, ears, and their relative position than a long description.

The muzzle is bare, covered with fine black scales, the margins of the underlip is also free of hair.

The *hands* compared with the feet (fig. 4 and fig. 5) are small ; the fingers thin with long, narrow, dark reddish brown (blackish on the base paler at the tip) nails. The internal side of the hands are covered with fine, flat scales of different size.

The scales on the under surface of the foot are larger than those of the hand and near to the heels are worn down, and the skin there appears glossy and flocky.

Tail. The upper portion of the tail only, as already mentioned, is covered with hair.

The *skull* of *M. tibol* examined from above (Fig. 7), shows a very round cranium and no ridges in the Parietalia ; examined from the side (Fig. 8), the greatest height of the skull corresponds to the fronto-parietal suture and makes the bending of the premaxillary region downwards very perceivable. (A line joining the cutting edges of the molars and premolar extended forward would pass *over* the base of the incisor.) The apex of the angular process of the inferior margin of the Zygoma corresponds to the anterior cusps of the second molar.

The *transversal ridges* of the palate are 9 in number, and their relative position is shown on fig. 6.

There are two *palatine foramina* (of which one is very much larger than the other) and several smaller on each side.

Dentition.

$\frac{3}{1}$, i. $\frac{1}{1}$, pm. $\frac{3}{3}$, m. (the 4th molar just appearing in both jaws)

The shape and size (in proportion to the molars) of the *upper incisors* present the most important character of the species. Compared with the dentition of other species of the same genus, *Macropus Thetidis* shows some resemblance to the incisors of *Macropus tibol* (1). The fold of the second lateral incisor is very much behind and is fully seen only when examined from below (fig. 11). The premolars are not longer than the first molars.

At the Australian Museum, I had the opportunity of examining a stuffed specimen of a kangaroo from New Ireland, *Macropus Brownii* Ramsay (2).

The dentition of *Macropus Brownii* is somewhat similar (in the relative size of the incisors) to that of *Macropus Tibol*, however, to what extent it is impossible for me to form an opinion, on account of the absence of the second lateral incisor in the specimen of *Macropus Brownii* in the Australian Museum. (1)

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(1) *Waterhouse.* Marsupiata, p. 144.

(2) This kangaroo has been first described by Mr. E. P. Ramsay in a paper read before the Linnean Society of New South Wales, in October 1876. (Description of a New Species of Halmaturus from New Ireland, by E. P. Ramsay. Proceed. Linnean Society of N S.W., Vol. I., p. 307) as *Halmaturus Brownii*. Another collection made in the same place and at the same time as the one which has been purchased by the Australian Museum, having been sent to London, Mr. E. R. Alston, not knowing about the description of Mr. Ramsay, described again the same kangaroo, as *Macropus lugens* (E. R. Alston, On the Rodents and Marsupials collected by Rev. G. Brown in Duke of York Island, New Britain and New Ireland. Proceeding Zoolog. Soc., 1877, p. 123, pl. XIX.) Although agreeing with the opinion that the animal in question is a *Macropus*, I keep the species name (*Brownii*) under which it was described *first*.

The *Macropus tibol* is also completely different from all the Macropi of the south coast of New Guinea that have been as yet described.

EXPLANATION OF PLATE.

MACROPUS TIBOL. Mcl.

(*All* the figures, with the exception of Fig. 1 and Fig. 11, *natural size.*)

Fig. 1.—Sketch of the side view of the Macropus tibol, partly after a sketch from life and partly from a photograph of a stuffed specimen. (about ¼ of the natural size.)

Fig. 2.—Side view of the head of the same animal, short time after death.

Fig. 3.—Front view of the muzzle.

Fig. 4.—Under surface of the hand

Fig. 5.—Plantar surface of the foot.

Fig. 6.—Palatine folds.

Fig. 7.—Skull from above.

Fig. 8.—Side view of the same.

Fig. 9.—Dentition of the upper jaw.

Fig. 10.—Dentition of the under jaw.

Fig. 11.—View of the upper incisor from below. *Twice* the natural size.

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(1) About the dentition of M. Brownii Mr. Alston says:—"The third upper incisor is but little longer than the second, and has the external fold close to its posterior border." *E. R. Alston,* loc. cit. Proc. Zool. Soc., 1877, p. 123.

ON TWO NEW SPECIES OF DORCOPSIS FROM THE SOUTH COAST OF NEW GUINEA.

BY N. DE MIKLOUHO-MACLAY.

(PLATE XX.)

Further examination of the New Guinea Collection in the Macleay-Museum, resulted in finding two new species of *Dorcopsis*, a short description of which is the subject of this paper.

Both skins had been purchased from Mr. Goldie, who obtained them in the vicinity of Hanuabada (1), (Village of Port Moresby), on the South Coast of New Guinea.

Though the skulls had suffered a great deal by the mode of preservation (in common salt), already mentioned in a former paper (2), a sufficient examination of the same was still possible, which enabled me to decide without doubt, that in the first place, the specimens belonged to the genus *Dorcopsis*; secondly, that they were distinct from each other; and thirdly, that they were distinct also from the other species of the genus that are known.

I believe that the reasons why they should be included in the genus are—the breadth of the premolars, the existence of small canines in the upper jaw, the general shape of the skull, and the direction forward of the hair on the nape of the neck.

I shall describe the two new species as *Dorcopsis Beccarii*, and *Dorcopsis Macleayi*, in honour of two men of science, whose works have contributed materially to our present knowledge of the Natural History of New Guinea.

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(1) During the last stay of Rev. W. G. Lawes in Sydney, I had the opportunity of ascertaining the right pronunciation and way of spelling of the name of the large village of Port Moresby. Although some natives call the place "*Anuapada*," others again "*Anuabata*," the greater number however, pronounce this name in such a way that the Missionaries of the London Mission Society, have agreed to spell it as "*Hanuabada*." In the dialect of the Motu tribe, "*Hanua*" means "big" or "large," "*Bada*" "inhabited land" or "village."

(2) Proceed. of the Linn. Soc of N.S.W., Vol. IX. Part 4, p. 892.

Dorcopsis Beccarii. N. sp. (Figs. 1-4.)

Adult ♀ from the hills in the vicinity of Hanuabada, on the South Coast of New Guinea. (Skin at the Macleay Museum.)

Some measurements taken on the skin :—

From tip of nose to end of tail...	1,000 mm.		39,7 in.
Length of tail	390 mm.	or about	15,4
From tip of nose to occiput	147 mm.		5,7
Length of ear (measured from behind)	49 mm.		2,0
Length of hand ... ... about	32 mm.		1,3
Length of foot ... ... about	141 mm.		5,6

4 nipples in the pouch.

Colour of fur : Dark grey, with a brownish tinge. The back, hands and feet very little darker than the breast, and only near the arms and on the base of the tail the brownish grey fur appears slightly tinged with rufous.

Each hair (of the back) is dark grey on the base, and of a much lighter tint for nearly ⅔ of the hairs length.

The *muzzle* with a deep median groove is bare and covered with a black scaly skin.

The large glandular *hairfollicles* on the laryngeal region are 3 in number, but not placed exactly in the median line (as is the case in *Dorcopsis luctuosa* and *Dorcopsis Chalmersii.*) Similar hairfollicles appear as well on the upper lip, over the inner canthus of the eye, and others some distance behind and below the outer canthus.

Ears not large, with some light brown hair on the posterior margin near the meatus; the inside of the concha nearly bare, showing blackish skin.

The hair on the nape of the neck of *Dorcopsis Beccarii* is as in *D. luctuosa* and *D. Chalmersii* directed forward. The converging point between the shoulders is 195 mm., (about 7,7in.) behind the behind the occiput.

The tip of the *tail* is white and bare, showing large elongated scales.

The skull of *Dorcopsis Beccarii* (Fig. 1) resembles that of *Dorcopsis Brunii*, of which very good representations are given on the plates appended to the work of Schlegel and Müller (1); it is very elongated and as in the skull of *D. Brunii*, the 2 marked ridges of the parietalia, running from the orbital margin of the frontal bone, join together in a median crest, which extends over the interparietal bone towards the superior anterior margin of the occipital bone. This median parieto-occipital crest is a point in which the skull of *D. Beccarii* differs from the skulls of *D. luctuosa* (1) and *D. Chalmersii*.

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(1) *H. Schlegel en S. Müller:* Over drie Biudeldieren uit de familie der kengoeroes (published as a part of the Verhandelingen over de Natuurlijke Geschiedenis der Nederlandsche overezesche Bezittengen door de Leden der Naturkundige Commissie en andere Schrijvers, uitgegeven op last van den Koning door C. T. Temminck, 1839-1844. Plates XXXIII. and XXIV.

The apex of the angular process of the inferior margin of the zygoma corresponds with the anterior cusps of the 3rd molar. The nasal bones are in the middle, a little narrower than on both ends, which character has also been noticed in *D. Brunii*. (2)

The *Palate* presents 8 well marked transverse folds without counting a few (6) smaller ones in the anterior corner of the palate, between the canines and the incisors. About the disposition of these folds I refer to fig. 2.

One large posterior *Palatine foramen* with several very much smaller behind on each side.

The median upper *Incisors* of *D. Beccarii*, present the character of the genus, being much larger than the lateral ones, which appears to be, in the specimen of the Macleay Museum, very much worn down and does not show any indication of cusps on their lower margin, as is the case in *D. luctuosa* and *D. Chalmersii*.

About the size (length) of the *canines* our specimen cannot be considered as a standard for the species (3). The distance from the canine to the premolar (measured on the base of the respective teeth) is 3½ times the distance between the canine and the 2nd lateral incisor.

The breadth of the upper *Premolars*, from before backwards, is quite as great as of the two molars together with the anterior cusps of the third (1). On the external surface of the tooth, from the cingulum several ridges with intervening depressions run at right angles to the cutting edge which in *D. Beccarii* is a little curved and not so distinctly cuspidated as in *D. luctuosa.* The anterior part of the tooth, examined from the external (labial) side is a trifle higher than the posterior. On the internal (lingual) side, the ridges and the depressions are less marked.

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(1) *A. H. Garrod*: On the kangaroo called *Halmaturus luctuosens*, &c., &c. Proceed. Zool. Soc., 1875. Plate VII.

(2) *Schlegel en Müller*: Loc. cit., p. 137.

(3) As already stated, the skulls of the specimens of the two species of *Dorcopsis* which description form the subject of this paper, had unfortunately suffered a great deal, by the mode of preservation, so that the minor details of the detition could therefore not be discerned, as for instance: I could not decide, if the lower margin of the lateral incisors is cuspidated or not, could not judge about the size and shape of the canines, etc., etc., in removing the crust of magnesia the enamel has been also very likely partly removed.

Examined from below (looking at the base of the skull) the external and internal outlines of the premolar, are not quite parallel, but there is an inflection noticeable on the internal outline which corresponds also with the narrowest transversal diameter of the tooth.

Out of the 4 molars, only the first is a little worn down as well as the cusps of the second. The fourth molar is the smallest and the posterior portion (cusp) of the same is smaller than the anterior, in which peculiarity the fourth molar differs from the other molars which have the two portions (cusps) nearly of the same size.

In *D. Beccarii*, the molars with the premolars form not two parallel straight, but two slightly curved lines converging more behind than in the front. [The distance between the two most prominent points of the internal side of the premolar being 18 mm., and that between the corresponding joints of the molars 15 mm. (2)]

In the lower jaw, the *incisors* are rather narrow and straight. The *Premolars* are scarcely less broad than in the upper jaw, and present the same proportion of breadth in relation to the first, second and third molar of the lower jaw as in the upper.

The slightly cuspidated cutting edge of the *Premolar*, examined from the side, is curved, the posterior end being the highest point of the same; viewed from above, the edge is also not straight, but convex outwards. Similar to the upper *Premolar*, the inner surface of the *Mandibular premolar* does not present any kind of tubercles (as is the case in *D. luctuosa* and *D. Chalmersii.*

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(1) The size of the premolars of *D. luctuosa*, in comparison with the size of the molars, present exactly the same proportion (Vide *Garrod*, On Halmaturus luctuosa, etc., etc. Loc. cit., p. 54.)

(2) This case proves that the arrangement of the teeth, premolars and molars, on both sides of the upper jaw, forming straight lines parallel one to the other, cannot, as *Garrod* supposed (loc. cit., p. 53), be regarded as a *constant* cranial character, which distinguishes *Dorcopsis as a genus* from *Macropus.*

Like in the upper jaw, the first mandibular mollar is the most worn down, as well as the cusps of the second.

DORCOPSIS MACLEAYI. N. sp.

(Figs. 5-9.)

Habitat.—South Coast of New Guinea, inland from Hanuabada. Stuffed specimen at the Macleay-Museum.

Some measurements taken on the skin before it was stuffed :—

From the tip of nose to the end of tail...	790 mm.	or about	31,2 in.
Length of tail	320 mm.		13,8
From occiput to the tip of nose...	112 mm.		4,4
Length of the foot	115 mm.		4,5
Length of ear *(measured from behind)*...	30 mm.		1,2

General Colour: Dark brownish grey, a little lighter on the ventral side.

Muzzle bare, black, slightly divided in the middle. The three conspicuous glandular hair follicles on the throat are not symmetrically disposed.

Ears very small.

The *hair* on the *nape of the neck* of *D. Macleayi* presents in its direction a very peculiar deviation from the usual direction of the hair of the neck of the other *Dorcopsidæ*, presenting two centres of irradiation of the hair, one above the other (one near the occiput, the other on the back between the shoulder, 140 mm. behind the occiput) instead of one, as is the case in *D. Mulleri*, *D. luctuosa* *D. Chalmersii*, *D. Beccarii*. Fig. 9 is added to illustrate this peculiar direction of the hair of the neck, and will give, I hope, a better idea of it than a long description. The end of the *tail* is nearly bare, for about 100 mm., (about 4 in.) white and scaly on the tip.

The *skull* of *D. Macleayi* presents many points of similarity with *D. Beccari*. A glance at plate XX. will easily prove this statement. The former is only in proportion to its breadth (from zygoma to zygoma) shorter than the latter. We find in skull of *D. Macleayi* the same median parieto-occipital crest, the same inflection on the external outline of the nasal bone as in *D. Beccarii*.

Looking at the base of the skull of *D. Macleayi*, we see a similar disposition of the 8 palatine folds to that of *D. Beccarii*. The arrangement of the teeth of the upper jaw forms in the former, less curved lines than in the latter, only the two posterior (4th) molars standing a trifle nearer together than the two third molars of the same jaw.

The lateral *incisors* are here also in proportion much smaller than the median ones, the second lateral a little larger than the first.

The *canines* are of about the same size as the first lateral incisor, but longer and much more pointed. The distance from the canine to the premolar is 3 times the distance from the canine to the posterior incisor.

The breadth of the *Premolar* surpasses by a little the breadth of the first and second molar together. On the internal surface the posterior portion of the premolar presents a small roundish inflection of the size of a pins head.

In the *lower jaw*, the incisors are narrow. The *premolar* comparatively smaller than in the upper jaw, its breadth being equal to that of the first molar and a part of the second (corresponding to the anterior portion of the tooth to the ridge of the second, or posterior cusp). The posterior portion of the cutting edge is elevated, a triangular tubercle which gives the tooth a characteristical aspect, different from the lower premolars of other species of *Dorcopsis*.

EXPLANATION OF PLATE. XX.

Fig. 1.—Skull of *Dorcopsis Beccarii* Maclay, from above.
Fig. 2.—A part of the same skull to show the dentition and the palatine fold.
Fig. 3.—Under jaw of the same skull.
Fig. 4.—Sideview of both jaws of the same.
Fig. 5.—Skull of *Dorcopsis Macleayi* Maclay, from above.
Fig. 6.—Palatine fold and dentition of the upper jaw of the same skull.
Fig. 7.—Under jaw of the same.
Fig. 8.—Side view of both jaws of the same.
Fig. 9.—Diagram showing the direction of the hair on the neck of *Dorcopsis Macleayi*. Centre of irradiation.

(All the figures, with the exception of fig. 9, natural size.

NOTES TO THE AUSTRALIAN SPONGES RECENTLY DESCRIBED BY CARTER. (1)

By R. von Lendenfeld. Ph.D.

As I am just now engaged in writing a Monograph of the Australian Sponges, I was particularly glad to receive the publications on the subject by Carter through the courtesy of the author.

There are in the part concerning the Ceraospongiæ and Myxospongia, no figures and the diagnoses are so short that it is, in a great number of cases, impossible for me to identify them with the specimens in my collection or to ascertain those characteristics which I consider as most important.

There are some, however, which in consequence of some accessory peculiarity or other I have been able to recognize. My collection of several thousand specimens of Australian Sponges is by far the finest as yet brought together from this locality, and I think that not only Carter but also all other scientists, who are working the Sponges will be interested in the result of a comparison between Carter's diagnosis and the specimens in my collection.

Halisarca australiensis (2) is not a Sponge at all, but the crusts described by Carter under the above name are the ova of Boltenias, surrounded by their Follicula. I myself believed that the slimy coatings in question were perhaps Sponges, and I examined them accordingly. The result of this examination are laid down in a paper published by me last year. (3)

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(1) *H. J. Carter.* Description of Sponges from the neighbourhood of Port Phillip Heads, South Australia. Annals and Magazine of Natural History, Ser. 5, Vol. XV., p. 196.

(2) *H. J. Carter.* L.c., p. 197.

(3) *R. von Lendenfeld.* On the slimy coatings of certain Boltenias in Port Jackson. Proceedings of the Linnean Society of N.S.W., Vol. IX., p. 495.

The Boltenia is probably Boltenia australis. The name Boltenia australiensis given by Carter (1) is not warranted.

Chondrilla nucula O.S. is mentioned as occurring in Port Phillip. (2) I have not found any specimens of this Sponge in any part of the Australian coast. I have, however, described a species of Chondrilla as C. secunda, n.s., from Port Phillip, in a paper read some time ago before the Linnean Society of N.S.W. (3) This species is somewhat different from C. nucula O.S., in the shape of its spicules, and particularly the configuration of the canal-system, but which outwardly appears very similar to the Adriatic species, of which I brought a specimen with me. I think it very probable that Carter's specimen is to be referred to my Chondrilla secunda, a Sponge very abundant in Port Phillip.

Luffaria digitata (4) is very meagerly described, but I think it highly probable that it is identical with a Sponge described eighteen years ago by Selenka (5) as Spongelia cactos, which has also been investigated by F. E. Schulze (6) and myself (7).

Carter has apparently not seen my paper on Sponges of Port Phillip, otherwise I think that my description of this Sponge would have been sufficient for identification. I have named it Dendrilla rosea, which name having priority, ought to replace the name Luffaria digitata given by Carter. (8)

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(1) *H. J. Carter.* Description of Sponges from the neighbourhood of Port Phillip Heads, South Australia. Annals and Magazine of Natural History, Ser. 5, Vol. XV., p. 197.

(2) *H. J. Carter.* L.c., p. 200.

(3) *R. von Lendenfeld.* A Monograph of the Australian Sponges. Abstracts of Proceedings of the Linnean Society for January, 1885.

(4) *H. J. Carter.* L.c., p. 201.

(5) *E. Selenka.* Ueber neue Schwämme aus der Südsee. Zeitschrift für wissenschaftliche Zoologie. Band 17, Seite 566, Tafel 35, fig. 5.

(6) *F. E. Schulze.* Untersuchungen über den Bau und die Entwickelung der Spongien. Die Familie der Aplysinidæ. Zeitschrift für wissenschaftliche Zoologie. Band 30, Seite 379.

(7). *R. von Lendenfeld.* Ueber Cœlenteraten der Südsee II. Neue Aplysinidæ. Zeitschrift für wissenschaftliche Zoologie. Band 38, Seite 277 ff.

(8) *H. J. Carter.* L.c., p. 201.

The most important feature of the Sponge is its peculiar subdermal cavity. Carter does not mention this, but as he does not say anything about the canal system at all, it is probable that he never examined any section-series.

Darwinella australiensis (1) is represented in my collection, but the canal system is not described by Carter, so that it is difficult to identify the species.

As Aplysina lævis (2) Carter, seven distinct species in my collection could be considered. These are very different from one another, but all coincide with Carter's diagnosis of the above species. They are forms which led to the Dysididæ of Marshall (3), of which Carter's Pseudoceratina durissima (4) maybe a true representative.

The diagnosis given by Carter of Aplysina purpurea (5), led me to believe that it might be identical with a Sponge examined by me, and named Aplysilla violacea (6), but now it seems that this is not the case, as Carter considers the Australian specimen of that Sponge to be identical with his Pseudoceratina durissima (7.)

Carter's new genus Halapsamina (8), is identical with Marshall's genus Psammapemma (9), established five years ago, and the latter name must be accepted as it has priority.

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(1) *H. J. Carter*. Description of Sponges from the neighbourhood of Port Phillip Heads, South Australia. Annals and Magazine of Natural History, Ser. 5, Vol. XV., p. 203.

(2) *H. J. Carter*. L.c., p. 204.

(3) *William Marshall*. Ueber Dysididen und Phoriospongien. Zeitschrift für wissenschafsliche Zoologie. Band 35, Seite 92.

(4) *H. J. Carter*. L.c., p. 204,

(5) *H. J. Carter*. Contributions to our knowledge of the Spongida. Order II., Ceratina. Annals and Magazine of Natural History, Series 5, Vol. VIII., pp. 103-105.

(6) *R. von Lendenfeld*. L.c.. Seite 237 ff.

(7) *H. J. Carter*. Description of Sponges from the neighbourhood of Port Phillip Heads, South Australia. Annals and Magazine of Natural History, Series 5, Vol. XV., p. 205.

(8) *H. J. Carter*. L.c., p. 211.

(9) *William Marshall*. L.c., Seite 113.

The species described as H. crassa (1) and H. lævis (2) cannot be distinguished. I possess in my collection numerous transition forms between them, and all these ought to be combined under the name given to them *previously* by Marshall (3), viz., Psammapemma densum. I think that I shall be able to distinguish a few species as the canal system is not the same in all the specimens I have examined. It is however, connected with quite unusual difficulties to make good series of sections through these arenaceous Sponges.

Holopsamma laminæfavosa (4), may be identical with Marshall's genus Psammoclema (5.)

Both Holopsamma fuliginosa (6), and turba (7) are unrecognisable.

The establishment of a new genus Sarcocornea (8), for a dry Dysidea is not justified. In the diagnosis there is nothing by which the only species could be distinguished from Dysidea.

Dysidea fragilis Johnstone (9) and Dysidea Kirkii Bowerbank (10) are mentioned. I only possess the latter in my collection. Chaliniform species are very abundant and I possess long series of continuous transition-forms. I believe this shape to be caused by mimicry after the true Chalinidae, which in consequence of their axial spicules are not very digestible food.

I cannot say anything about the species described as Dysidea hirciniformis (11) and chaliniformis (12). The descriptions are so short that it is simply impossible to make any use of them.

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(1) *H. J. Carter.* Descriptions of Sponges from the neighbourhood of Port Phillip Heads, South Australia. Annals and Magazine of Natural History, Ser. 5, Vol. XV., p. 211.

(2) *H. J. Carter.* L.c., p. 212.

(3) *William Marshall.* Ueber Dysididen und Phoriospongien. Zeitschrift für wissenchafsliche Zoologie. Band 35, Seite 113.

(4) *H. J. Carter.* L.c., p. 212.

(5) *William Marshall.* L.c., Seite 109.

(6) *H. J. Carter.* L.c., p. 213.

(7) *H. J. Carter.* L.c., p. 213.

(8) *H. J. Carter.* L.c., p. 214.

(9) *H. J. Carter.* L.c., p. 215.

(10) *H. J. Carter.* L.c., p. 216.

(11) *H. J. Carter.* L.c., p. 217.

(12) *H. J. Carter.* L.c., p. 217.

I consider the genus Dysidea as characterised by the following points :—

(1). Transparent hyaline Mesoderm without foreign bodies in the ground substance. (1)

(2). The canal system and ciliated chambers of Spongelia as described by Schulze.

(3). Foreign bodies forming all the fibres.

It can of course not be decided by the description whether Carter's specimens belong to the genus Dysidea in this sense or not.

The sponge described by Carter as Spongelia stellidermata (2) is probably identical with some specimens in my collection which, however, do not belong to the genus Spongelia but to another Family (3), that of the Spongidæ. I have named this Sponge Cacospongia gracilis (4) but it may appear necessary to establish a new genus for it At all events it does not belong to the genus Spongelia Schulze, who was the first to establish a diagnosis on a rarely reliable and scientific basis (5).

Carteriospongia caliciformis (6) is described from a dry specimen so that no opinion can be hazarded at to its real position in the system.

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(1) *F. E. Schulze.* Untersuchungen über den Bau und die Entwickelvung der Spongien. Die Gattung Spongelia Zeitschrift für wissenschaftliche Zoologie, Band 32, Seite 111 ff.

(2) *H. J. Carter.* Descriptions of Sponges from the neighbourhood of Port Phillip Heads, South Australia. Annals and Magazine of Natural History, Ser. 5, Vol. XV., p. 219.

(3) *G. Vosmaer.* Studies on Sponges I. Mittheilungen der Zoologischen Station in Neapel, Band IV., Seite 445. (Vosmaer's classification is identical with mine, which I arrived at independently, and which is therefore very likely to be correct.)

(4) In 1883, I identified the Sponges from several Museums, and I supplied several with names, the diagnoses of which remained in schedule. The Sponges referred to can be seen in the Museum of the South Australian Institute at Adelaide.

(5) *F. E. Schulze.* L.c.

(6) *H. J. Carter.* L.c., p. 221.

As the configuration of the canal system is not described and the microscopic structure of the soft parts generally hardly referred to, and as these are considered all-important by me, it is only natural that I should not be able to utilize Carter's Essay. Just as it was necessary that O. Schmidt compared Bowerband's species with his own I find it advantageous to review Carter's essay from my point of view, so that anyone may be enabled to make use of it. To those who hold the views of Poléjaeff, Vosmaer and myself, this review will be most welcome. As I am in possession of extensive collections and working the subject on the spot, I have thought myself in a position to write this review.

ON THE FERTILIZATION OF *GOODENIA HEDERACEA*. (Sm.)

BY ALEX G. HAMILTON, ESQ.

PLATE XXI.

My attention was drawn to this subject by reading Mr. Haviland's paper on *Goodenia ovata*, in the Society's Proceedings for June, 1884, and I examined a large number of specimens of *G. hederacea* in all stages of growth, to ascertain if the method of fertilization was similar to that described by Mr. Haviland *(i.e.)*, accomplished by insects, or other extraneous means. I have so far, collected the following plants of the *Goodeniaceæ* in this (the Mudgee) district; *G. hederacea, G. heteromera, G. paniculata, Velleia paradoxa, V. macrocalyx*, and *Dampiera stricta*. Of these *V. paradoxa, V. macrocalyx* and the species under consideration are very generally distributed over the district; but the others are local in occurrence, *G. heteromera* being only found in scattered patches on the banks of the Cudgegong River, and *G. paniculata and Dampiera stricta* being confined to sandstone at the head of Cooyal Creek and on the Goodaman Range.

I have selected *G. hederacea* for experiment on account of its being plentiful in my immediate neighbourhood.

On taking a very young bud, and carefully removing the calyx and corolla, so as to expose the style, filaments and anthers, we find the anthers, five in number, a little longer than the style and closely clustered round it; the style itself is in a rudimentary condition as regards the indusium which is represented by a slight shelf on the front and back of the flattened termination of the style. The superior surface of this flattened part is the stigma (see fig. 1). Taking a slightly older bud, we notice no alteration except that the ledge representing the future indusium has grown up higher in the centre and extended to the ends (see fig. 2). In a still farther advanced bud the only change in the relative position of the style anthers is that the latter are slightly higher than before, but in the style itself, a great deal of alteration is perceptible, the indusium being now higher than the stigma, and the edges showing the hairs which are so striking a feature of the mature organ (see fig. 3). We now examine a bud nearly ready to open. Here we find the anthers full grown but not mature, and leaning over the indusium (fig. 4) their bases being on a level with the top of that organ, and the upper part of the filament developed into a point which projects beyond the anther itself (see fig. 5). The indusium is developed into a deep cup, the edges being densely clothed with short thick hairs, and the outside inferior surface having a quantity of longer and thinner hairs on the centre (see fig. 6). At the bottom of the cup is the stigma, now almost ready to receive the pollen. For the next stage, it is necessary to choose a bud just beginning to show slits at the sides. On removing the corolla the anthers will be found clasping the indusium and the points (figs. 7 and 8) turned over into the cup of the indusium, which is quite full of pollen. The anthers will be seen to be quite empty, and if the parts be exposed to the air for a short time (as would happen naturally by the fuller opening of the bud) the filaments contract and twist and the anthers shrivel. It will immediately strike the observer that the style must have lengthened considerably and rapidly, as in all younger specimens the *bases* of the anthers were on a level with, or above the cup, and here it is the *points* of the anthers which are level with it. Another noticeable feature is the *packing* of the pollen into the cup—a point of which I shall have more to say presently. Our next step is to examine a fully open flower. The basal portion of the style is bent upwards so as to protrude the indusium through the slit between the two upper lobes of the corolla. The anthers are entirely empty, withered, and bent back through the slit, so that they are outside of the flower—with them we have done. The slit between the upper divisions of the corolla widens in the centre, to permit the indusium to come out of the tube, but contracts again beyond that, so that the edges are close together, and each half of the lobe bulges forward so as to make conjointly, a hemispherical cavity just in front of the indusium, to which it forms a cover, completely cutting the indusium off from the outside of the flower, as shown in the diagrammatic section (fig. 10). On examining the mouth of the indusium, it will be found to be narrower and more slit-like than in the last specimen. Now examine a series of full-blown flowers of increasing ages, and the mouth of the indusium will be found to close more and more on its load of pollen, while it still remains behind the barrier formed by the upper lobe. At last it will be found quite closed, and then the flower withers and the edges of the lobe shrink away from each other allowing the indusium to once more project into the flower, but its mouth is closed against all intrusion. In this stage the indusium has a flattened shape as in fig. 9.

From examining a very large number of the buds and flowers in this way, I have come to the conclusion that fertilization is effected in the following manner:—When the anthers are full sized, and ready to burst, they bend towards each other over the indusium so that their bases form a ring above the mouth of it, the ring being a trifle less in diameter than the mouth. The style at this time begins to lengthen rapidly forcing its way up through the anthers, and by means of the fringe of hairs on the edge scraping and brushing all the pollen out of the anthers, the pollen drops into the cup as the latter quickly grows upwards. This packing of the pollen puzzled me greatly at first, for insects could not possibly do it, and neither could the mere dropping in of the pollen cause it to cohere so tightly as it does. As soon as the anthers have discharged all their pollen, they wither and twist outwards through the slit in the corolla; and when the indusium is filled with pollen, it begins to close and assume a flattened shape, while at the same time the fringe of hairs slope over the mouth so as to cover the pollen and retain it within the cup. Insect interference is provided against by the cover formed by the back lobe of the corolla; and by the time the flower is withered and the indusium once more projects into the tube, the cup is completely protected by its closing.

On the whole this flower seems to me to exhibit a most elaborate and beautiful series of contrivances to ensure fertilization by its own pollen; and not the least remarkable feature is the fact that the same set of organs which in *Goodenia ovata* *prevent* self-fertilization, in *G. hederacea* ensure it. I am struck by a remark in Mr. Haviland's paper to the effect that in *G. ovata* when the indusium is outside the corolla, a touch in the tube brings it into the proper position for insect fertilization. I tried the experiment in the flower under consideration, by pushing a camel hair pencil, the point of my finger and various pointed and blunt articles into the tube of the corolla, but in no instance would the back lobe open unless a considerable amount of force was used. One thing puzzled me a good deal, and does so still, viz., in two young buds the anthers were *shorter* than the style, and in this case the brushing out of the pollen could not occur; but these being only found twice in the large number of buds I dissected, I am inclined to think them merely accidental malformation. It is a significant fact that neither full anthers nor empty indusia are ever found in open flowers.

I may say that to observe all the stages, it is necessary to examine a very large number of specimens, and even then but few buds will be found just at the critical point when the anthers are being emptied by the elongating of the style. This leads me to think that the latter stages of the process are gone through rapidly. As examination and note taking in the field are irksome I always collect all the flowers and buds procurable and keep them in small bottles or homœopathic medicine tubes with a piece of wet lint. If then tightly corked they will keep for days and can be examined at leisure. In conclusion I may be allowed to express a wish that some of the other members of the Society would examine this flower and see if their experience tallies with mine. Dr. Woolls' mentions it as being found in the County of Cumberland,

and it would be interesting to discover if there is any difference between the same species in coast and inland specimens.

REFERENCES TO PLATE XXI.

Fig. 1.—From young bud showing rudiment of indusium, St. Stigma in. indusium, x 20.

Fig. 2.—Side, front, and top of indusium in further advanced bud, x 10.

Fig. 3.—Front and side in older bud, x 8.

Fig. 4.—Arrangement of anthers and indusium in nearly full-grown bud, x 8.

Fig. 5.—Anther showing point which afterwards hooks over indusium, x 10.

Fig. 6.—Mature indusium, x 10.

Figs. 7 and 8.—Arrangement of anthers in full grown bud just opening; indusium full of pollen, x 8.

Fig. 9.—Fertilized and closed indusium, x 8.

Fig. 10.—Diagrammatic section of open flower, showing fold of upper lobe of corolla, which forms a cover for indusium, cx, calyx an. anthers; in indusium; bl. upper lobe; cv. cover; ul. under lobe, x 2.

NOTES ON THE HABITS, &c., OF BIRDS BREEDING IN THE INTERIOR OF NEW SOUTH WALES.

By K. H. Bennett, Esq.

1. Falco subniger.

As very little seems to be known of the habits, of this the fiercest and most rapacious of our falcons, perhaps a few notes on the subject would be of interest. I will premise my remarks by stating that I have for many years resided in a locality where these birds, at certain times of the year are tolerably numerous (the Lachlan River), and I have thus had many opportunities of observing their habits, &c. The first thing that strikes an observer with regard to this bird is its extraordinarily swift flight, almost equalling that of *Cypselus*; and the next its powers of endurance on the wing, for like the frigate bird, it passes by far the greater part of the day (at any rate) on the wing, and it is indeed a rare thing to see a black falcon perched.

I have said that it is tolerably numerous at certain times—for here they are undoubtedly migratory, arriving about the beginning of September in company with the small red quail *Turnix velox*, on which it preys; and departing about February. Quail and the young of birds frequenting the plains, such as *Anthus*, *Cincloramphus*, *Ephthianura aurifrons*, *&c.*, constitute its chief prey, but only the young, as a rule of any but quail, for great as are the falcons powers of flight, he has more than a match in the adults of any of the above mentioned birds, for they dodge and turn so quickly that the falcon has no chance with them, and so well does he know this, that it is only when rendered desperate by hunger that he will ever attempt to catch one, and much more rarely it is that he is successful, and when unassisted by his mate the chase may be set down as hopeless, for just as he is on the point of clutching his prey, by a sudden turn it eludes his grasp and goes sailing off in quite another direction, whilst the baffled falcon is carried by its own impetus in the opposite; it is very rarely indeed that the falcon makes a second attempt after his failure, but I have occasionally seen one do so again and again, with no better success, until at last the pursuit is given up in disgust. On one occasion a lark, *Anthus australis*, defied the united efforts of no less than three falcons, and for a considerable time, the lark simply avoiding by a quick turn each falcon's stroke, but finally it fell a victim, completely tired out. One peculiarity of this bird, not shared by any others of the family, that I am aware of, is its habit when watching for prey of frequently ascending to such a great height as to be invisible, which shows the wonderful power of vision possessed by this bird. Many and many a time when on the plains, miles from any timber, with a flock of sheep, "camped," I have carefully scanned the sky overhead and around to see if a falcon was visible, but not a speck has met my gaze in any direction. On starting to drive the sheep and almost immediately have they disturbed a quail, a rushing sound would be heard overhead, and on looking up a dark object would be seen descending with fearful rapidity, and so compressed or gathered together, as to render any one unacquainted with this bird unable to say what the object was; when some thirty or forty feet from the ground the descent is arrested, and by a sudden movement and expansion of wings the falcon assumes a horizontal attitude and the chase commences, which as a rule, results in the speedy capture, and the falcon by a series of graceful curves again mounts into the air, devouring its prey as it ascends, an occasional tuft of blood stained feathers slowly wafted earthwards, evidencing its success; the above operation being repeated when the next quail, or some young bird is flushed. Sometimes however, the falcon is baulked by the quarry suddenly dropping into some sheltering salt bush (rarely more than a foot or eighteen inches high). when this is the case the falcon quickly arrests its flight, and closing its wings by a powerful movement shoots perpendicularly into the air for some distance, and then expanding its wings hovers for a short time over the bush in which its prey has taken refuge. Should it be a scanty one and the unfortunate bird be visible, the falcon slowly descends, alighting on the top of the bush and flapping its outstretched wings, drives the terrified victim out, when it is speedily clutched in the powerful talons of its remorseless foe. Should the bush prove too dense, and the bird not to be seen, the falcon gives it up and mounts skyward again. As an instance of the falcon's rapacity, I enclose the following clipping, which I contributed to the Naturalists Column of the "Queenslander" some years since, merely adding that the hawk mentioned as captured by the falcon was *Elanus scriptus* :—

"As I see that you invite correspondence on the fauna of Australia, permit me to offer my experience on the "Plague of Rats," and also of a species of hawk which accompanied and preyed upon them. In the year 1864, when the Lachlan of the back country was first occupied, these rats were found in incredible numbers all over the vast plains of that region, where they burrowed in the soft soil or made nests of grass in the dwarf saltbushes with which the plains were thickly covered. These vermin were soon found a great nuisance by the destruction they caused in rations, saddles, &c., &c., and although we "legislated" against them and introduced cats, and scattered poison with a liberal hand, still the nuisance was unabated. Things went on in this manner for some six or eight months, when the rats—having, I suppose, fulfilled their mission, whatever that may have been—disappeared, as did also the hawks and owls. The rats and owls have not appeared here since, but the hawks came in small numbers on a subsequent occasion. The plumage of these hawks on the breast and under parts was pure white, the back—with the exception of the shoulder coverts—light grey, almost white. the shoulder coverts black. They spent the greater part of the day on the branches of the dead pine-trees, on which so closely were they packed that, at a distance, and with their breasts turned towards the observer, the branches looked as if covered with snow. They were generally very sluggish and inactive, and would sit for hours motionless. I have often seen the little blackboys knocking them off on one side of a tree with their boomerangs, while those on the other side remained perfectly still, and apparently quite unconscious of danger. I have frequently fired amongst them with a rifle, killing three or four at a shot, and the others have not stirred."

"As an instance of their sluggishness or stupidity I may mention that I one day saw a black falcon—one of the swiftest and most powerful of our falcons—dash into a number of them perched on a dry pine-tree, close to the house, and clutch one in its sharp talons; both birds fell to the ground, and after struggling for a few minutes the falcon rose heavily and flew off with its prey; the other hawks sat perfectly still all through the performance. This went on for several days, the falcon each time securing a victim. Noticing that the falcon's visits occurred at about the same hour daily, I determined to try and capture both the falcon and his prey. With this object I secreted myself in some thick bushes close to the foot of the tree on which the hawks sat. I had not long to wait, for soon falcon and hawk came struggling down within a few feet of where I was concealed, and I sprang out and caught one of the previously outstretched wings of the Falcon. So fierce was his clutch that I had difficulty in releasing the hawk, which, though severely wounded, had sufficient strength to make off. I cut the falcon's wings and kept him in confinement for some time, but he was so fierce and intractable that I got disgusted with him, and ended his career."

"I fancy these cases of one bird of prey attacking another with the intention of feasting on him are very rare; in all my wanderings I never saw but one other instance of the kind, and in that case the aggressor was a peregrine falcon (1) and the bird attacked a white-fronted owl (2); the latter, however, after a sharp tussle, managed to free himself. But I am digressing, for which I humbly crave pardon; and will now return to the hawks. As I have said, these birds would sit for the greater part of the day motionless, but at a certain hour in the afternoon they simultaneously take wing, and by a series of graceful circles gradually rise to a great height, until their white breasts became mere specs in the blue sky. After gyrating about at that height for some time, they would descend in the same manner and resume their perch, sitting there until dusk, when they would fly out on the plain, over which they might be observed hovering like sea-gulls, and every now and then pouncing down upon a rodent, which they devour whilst on the wing. By sunrise the next morning they all would be on their accustomed perches. The number of rats destroyed by these birds must have been very great, for the ground beneath the trees they frequented was thickly covered with the balls of fur which, like the owl, they have the power of ejecting from their stomachs. The native dogs at that time were very numerous, and used to feed upon the rats (I haven taken eleven from the stomach of one dog). Yet, notwithstanding dogs, hawks, owls, cats, and poison, there was no perceptible diminution in their numbers for some months, when all at once it was noticed that both they and the hawks had greatly decreased, and within a week of that time not a rat or hawk was to be seen, and the rats have not appeared since. Where did they go?

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(1) *Falco melanogenys.* (2) *Strix delicatulus.*

"In 1870 (the year of the great floods here) we had a similar visitation, but this time it was mice instead of rats. They made their appearance early in January of that year, but not in great numbers at first; these, I suppose, were the *avant couriers* of the countless swarms which were soon to follow, for by the middle of February the whole country was literally alive with them, and the devastation they made in flour, sugar, and other things was terrible. This invasion lasted for seven or eight months, when they gradually and almost entirely disappeared; but 'there are still some few remaining who remind of the past.' A few of the hawks to which I have alluded came with the mice, but did not stay, departing long before the latter. Some idea of the numbers of the mice may be formed when I state that one day being over at the adjoining station my friend informed me that he had taken 4000 dead ones out of the store that morning, the result of one night's poisoning; he assured me that he had counted them as the men picked them up."

As another instance, a friend of mine (who is a keen observer) told me that he was driving a small lot of sheep, and a falcon had made several ineffectual efforts to catch a lark, and whilst in pursuit of it some distance ahead of the sheep, they disturbed a black duck, *Anas superciliosa*, from her nest under a cotton bush, and she flew off in the direction the falcon had gone; the latter caught sight of her, and leaving the lark turned and made for the duck, and so great was the concussion when they met that they fell to the ground, and my friend on riding up found both dead.

The black falcon sometimes breeds here but not often, for during my long residence (over 20 years) in this locality I have only met with their nests on four occasions (one only a few days since). It breeds in September and lays four eggs which much resemble those of *Hieracidea orientalis.*

The nest I recently found was a clear case of appropriation, as last year it was occupied by a pair of *Gypoictinia melanosternum*, the falcons had possession however, this year, and the nest contained four eggs. Immediately beneath the edge of the nest a pair of *Xerophila leucopsis* had constructed theirs, which contained young, and the old birds were flying in and out apparently quite unconcerned at the proximity of their dangerous neighbours well knowing that the intercices between the large sticks of which the upper nest was composed afforded them a secure asylum.

The habit of builing beneath the large nests of the hawk family is common with several species of small birds, but although the raven *Corone australis*, constructs a nest as large as many species of hawks, yet these small birds nests are never found beneath them, instinct teaching the builders that their eggs or young would not be safe even there from this cunning bird, and in instances where they have built their nests beneath those of hawks, I have noticed that none are tenanted except in cases where the upper structure has also been occupied by the hawk, the presence of whom effectually keep the crows away.

A large flat-winged Dipterous parasite infests the black falcon. I have seen a somewhat similar insect on the other birds but not nearly so large as that infesting the falcon, it moves about sideways under the feathers with extraordinary rapidity.

2. GLAREOLA-GRALLARIA.

This somewhat singular bird is one of the few migratory species that visit this part of the colony and remain during the intense heat of summer. As a rule it arrives towards the end of September and departs about the end of February. During that interval it breeds, and the places chosen for this purpose, and in fact its habitat during its stay are the bare patches of ground, entirely destitute of vegetation, so frequent on the plains here. Some of these bare patches are of considerable extent, and the surface of the ground is broken up into countless small pieces, from the size of a pea to that of a walnut, giving the appearance of having been chipped over with a hoe. This is partly due to the nature of the soil and to the intense heat and dryness of the climate which causes the surface to crack in all directions and become quite loose. It is on these loose patches that the *Glareola* deposits its eggs, 2 in number. It makes no nest, but simply lays its eggs on the bare surface of the loose broken ground, and so much do they assimilate in form and colour to the surrounding lumps of earth that unless the bird is seen to move off them a person might walk on them and not observe them, and on several occasions I have taken my eyes off the spot for a few seconds and then had considerable difficulty in distinguishing the eggs again. As a rule the eggs are laid in October, but this year, 1884, for the first time, I obtained them in September. Usually it is very shy, but during the period of incubation it looses this shyness and both parent birds will allow themselves to be approached quite closely and seem utterly regardless of danger in their anxiety to protect their eggs or young. In fact I have seen the female bird so loath to quit the eggs that it was only when I touched her with my hand that she would quit the nest, pecking savagely at my hand several times before she did so; the male bird in the mean time laying flat on the ground, with outstretched wings, a few feet off, uttering the most plaintive cries.

The young in the earlier stages are exceedingly helpless, and although the colour of their down so closely resembles that of the loose pieces of earth amongst which they were hatched that when motionless they are undistinguishable, still their slightest movement would possibly attract the eye of some passing hawk or crow, and to guard against this danger, the old birds conduct them as speedily as possible to one of the numerous holes in the ground to be found all over the plains (the mouth of some deserted burrow is a favourite place) into this hole the young are led and there they remain until they are able to fly. When the young are concealed in one of these holes, one or both of the old birds may always be seen close by and on the approach of danger I have frequently seen both take refuge in the hole and on watching for a short time have seen one or both come cautiously out again only to disappear once more on noticing me. This bird is the only living creature I know of, that seems to revel in the intense heat of mid-summer in this locality for when every other living animal has sought shelter from the withering mid-day sun, it may be observed running briskly about on the bare red patches I have described, when the surface of the ground is so hot that a man could scarcely bear his hand on it, in fact the hotter the day the more this feathered salamander seems to enjoy it. It however, requires a good deal of water for it drinks several times during the day, and often travels many miles going to and returning from the tanks containing water, and numbers can be obtained by waiting at the water until they come to drink.

These birds run with great rapidity when in quest of food, &c., and suddenly pausing, the body undulates for some seconds as if poised on delicate springs when the running is again resumed. Its flight which appears somewhat laboured from the extreme length of wing is nevertheless light and buoyant and is characterised by the same erratic zig-zag motions so noticeable in the *Eurostopodidæ*. Its food consists of insects which are captured both on the ground and on the wing, the bird sometimes running along the ground in pursuit, and springing up to the height of a foot or more as the insect rises, occasionally towering to a considerable altitude as some flying insect attracts its attention returning to the ground in the skimming zig-zag manner before described.

THE GEOLOGY OF DUBBO.

By the Rev. J. Milne Curran, F.G.S.

(Plates 22 and 23.)

Introduction.—Dubbo is situated on the verge of the great alluvial which characterise the interior of New South Wales. A few miles to the north-west, we see, as it were for the last time, the older rocks before they are lost, as truly as if they dipped under the sea. The general aspect of the country is level. There are no mountains, and the few hills which diversify the otherwise almost uniform level are simply patches of basalt or of a very ferruginous conglomerate which have been able to resist the denuding influences better than the prevailing sandstones.

The average height above the sea of the country, immediately about Dubbo, may be taken at 900 feet. Although not situated exactly on the plains which extend hence towards the west and north-west, yet the same causes which have been at work to form those plains are very marked in their effects about Dubbo. In other words the present physical features of the country are due more to a filling up process than to the effects of denudation. The precipitous and rugged country about the Upper Macquarie, the chains of basalt capped hills in the Bathurst district, and all the surfaces which form the valley of the river down to Wellington have been carved into their present shapes by the subaërial influences of air, frost, rain and rivers. Near Dubbo we might draw the line which would show the limit of deposition, denudation and deposition being synchronous and co-equal. The basaltic hills referred to have their representatives at Dubbo, but with their summits barely on a level with the surrounding country.

Previous Observers.—Mr. Stutchbury, when in the employment of the New South Wales Government, visited the coal seams which crop out on the Talbragar River, about 28 miles north-east from the town. He considered the seams exposed as valueless, but believed them to represent some part of the great coal formation of the colony. In February, 1870, Prof. Thomson, when on a visit to Wellington district, examined some specimens (forwarded to him by Mr. James Samuels) which he labelled "Fossil Plants similar to some found in the coal measures at Talbragar."

Rev. W. B. Clarke, in the third edition of the "Sedimentary Formation," (1875) says he traced the Hawkesbury rocks at intervals all along the escarpments to the westward of Sydney from the latitude of the Clyde River to that of Talbragar.

Mr. G. S. Wilkinson, F.G.S., F.L.S., the present head of the Geological Survey, visited the Dubbo district in 1880. In his progress report for that year he says "Immediately about Dubbo the formation consists of the Hawkesbury formation, covered in places with basalt and auriferous tertiary gravels, but on the Talbragar River, about 12 miles north-east of Dubbo, the Hawkesbury rocks are seen over-lying the coal measures, containing seams of inferior coal; there is little doubt therefore but that the coal measures will be found underlying the Hawkesbury rocks in the vicinity of Dubbo, but at what depth can only be ascertained by boring or sinking."

Mr. E. F. Pittman, who examined the same localities, in company with Mr. Wilkinson, says (Annual Report Department of Mines, New South Wales, 1880, p. 243) "From Dubbo the road via Cobborah to the Castlereagh lies over the Hawkesbury sandstone, with overlying Pleistocene drift and patches of basalt.'

"About Heane's Station there are outcrops of what appears to be the true coal measures. These are well seen in section with small seams of poor coal at Ballimore on the Talbragar about 6 miles from Mr. Heane's, though I could find no fossils except some faint impressions of plant stems.

"South of Dubbo the Hawkesbury sandstone extends for about 10 miles (with occasional cappings of basalt) and then gives place to rocks of Silurian age."

"The country between Dubbo and the Castlereagh appears to be formed of a coal basin, the centre of which is situated a few miles north of Dubbo, and it is quite probable that the thin seams of coal seen in the cliff at Ballimore may overlie others of a payable character."

In February 1883 the Rev. J. E. Tenison-Woods describes some fossils from this district. [L. S., N.S.W.] This with my own short paper (read on the 26th March) seems to be all at present known of the Geology of Dubbo.

Distribution of Rocks.—Sandstone is the prevailing formation. It is not known exactly how far it extends towards the north-east. Due east from Dubbo it extends about 30 miles and then gives place to Silurian limestones and slates. The sandstones differ very much in texture and composition in different localities. Generally it is hard and durable when it lies under, or is in close proximity to basalt. At Barbigal and at Troy a quartzite with a scarcely perceptible granular structure is developed in this way, while in many other place it is so friable as to weather into a shapeless mass after a few months exposure.

When exposed along creeks or in cuttings it presents all the peculiar characteristics of the Hawkesbury sandstone. The faces of the rocks are excavated by atmospheric influences and the rending effects of crystallising salts, into caves and hollows; the false bedding, peculiar ironstone bands, and concretions, are strongly suggestive of the sandstones on the eastern slopes of the mountains.

Conglomerates are met with at various levels in the series but never preserving their character over any considerable area. The shingle of an old water-course is exposed on the Talbragar near Murrungundy. The deposition and "lie" of the shingle show—if a solitary instance is of any value—the drainage to have been in the same direction as in the existing river system. A thick bed of conglomerate caps the hills over the coal at Ballimore.

Surface indications of conglomerates are apt to mislead casual observers in the country about Dubbo. In travelling over the country known as Ironbark Ridges the formation seems to consist of very thick beds of conglomerates. It is visible in the valleys and on the hill tops—quartz and felspar pebbles cemented by a ferruginous paste. On sinking it is found to be a comparatively thin layer on the surface. The explanation is that the pebbles are probably all that remain there of many hundred feet of rock through which they were distributed. The cementing is an altogether subsequent work.

It was reported that a thick bed or beds of conglomerate was cut through in the diamond drill bore put down near Dubbo by the Railway Department, but from an examination of the cores, I can say that the conglomerate so called barely merits to be described as a pebbly sandstone. True conglomerate is an exceptional formation in the District.

Between the Brick Yards platform and Murrumbidgeree Station the Palaeozoic rocks disappear and the first section of the sandstone is seen.

This is the extreme edge of the basin, for limestone crops out in a creek a few yards to the north of the railway fence. From this the sandstones and shales continue, with occasional patches of basalt, until granite is met at 289-10 miles. Throughout this distance every visible section shows wavy beds forming small basins without any appreciable general dip. Nowhere is the dip greater than 5°.

Before meeting the granite at 289 miles a remarkable instance of metamorphism may be seen. A ferruginous rock with irregular concretions or rather patches of darker colour, contains water worn pebbles. A few chains further it grows more compact and a crystalline structure is gradually developed. Further on it might be called a Binary Granite with flesh coloured felspar.

Beyond this again the sandstone and ferruginous grits appear, then granite continues for about six miles.

About 293-60 miles an exceptional condition presents itself. Instead of the usual friable and horizontal beds, the rocks, compact and slaty and not unlike some upper Silurian and Devonian beds in other parts of the Colony, are inclined at an angle varying from 58° to 63° dipping to the north-west. This is the only instance of the kind in the district. It is not impossible that they might represent the older rocks appearing again at this the other extremity of the basin. I could find no fossils. A more probable opinion is that they are part of the Dubbo series, tilted to their present position by an outburst of basalt. The nearest visible rock is granite, but for many reasons it is impossible to think the granite of later origin than the sandstones. The inclined rocks form an isolated hill, a fact which increases the difficulty of determining either their relative age or the cause of the disturbance. An additional interest is attached to these beds from the fact that they dip under the great plains at this point.

Basalt covers about one tenth of the area of the country immediately around Dubbo. The isolated patches on the right bank of the river are part of one great stream that flowed down the old river valley. The basalt on the left bank of the Macquarie seems to be an older flow. A wall of vesicular basalt 40 feet in height may be seen on the Mogrigui Creek.

On Gearie Station near Murrumbidgeree there is an isolated conical hill, which is I have no doubt an old volcanic "neck," It is very different from the usual table-topped basalt-crowned hills that may be seen from its summit, and which are the remains of a great basaltic plateau.

A peculiar appearance is often presented when the surface of the basalt is weathered into a gentle slope. The surface of the ground resembles a ploughed field. The ridges are always parallel but often curved at sharp angles, though still preserving their parallelism. The average height of the ridges is about five inches or less from crest to trough, and they vary in width from six to eighteen inches. No satisfactory explanation as to the cause has yet been given. I would suggest that the appearance is connected with the jointings of the basalt below. The furrows do not always follow the incline on the surface, so they cannot be due to the effect of *running water*. We must only suppose that joints in the basalt are being filled with clays from the surface by rain waters as they filter through, and that every furrow marks the position of a joint in the cooled lava stream.

Division of the Strata.—Although surface indications would lead to the belief that all the rocks about Dubbo should be referred to the same age, we have ample evidence to enable us to distinguish two formations—the Dubbo sandstones and the Ballimore coal basin.

The diamond drill boring put down near the town of Dubbo showed the following section. A section I measured at Ballimore gives the following succession :—

	′	″
Grit	25	0
Ironstone	0	6
White shale and ferruginous sandstone	18	0
Ironstone	1	0
Impure fireclay	3	6
Ironstone	0	6
Fireclay	3	2
Ironstone band	1	6
Impure fireclay	6	0
Irregular ironstone bands ferruginous sandstones and shales	14	0
White fireclay	1	3
Talus	20	0

The fossils are equally distinct.

FOSSILS FROM DUBBO.

Thinnfeldia odontopteroides.
media.
Odontopteris macrophylla.
Alethopteris australis.
Hymenophyllites, sp.
Walchia, sp.

FOSSILS FROM BALLIMORE.

Sphenopteris crebra.
glossophylla.
Neuropteris australis.
Alethopteris currani.
concinna.
Merianopteris major.
Walchia milneana.

In correlating these formations with others we have to depend altogether on the fossils. To facilitate comparison I have compiled the table (A) appended, which shows at a glance what fossils are common to any two localities, where our Mesozoic rocks are developed. Authority or reference is given for every species enumerated. Dr. Feistmantel's larger work is so inaccessible to students outside Sydney, that I refer to his paper in the volume of our Royal Society for the year 1880.

TABLE A.

—	Alethopteris australis.	Alethopteris concinna.	Alethopteris currani.	Thinnfeldia odontopteroides.	Thinnfeldia media.	Phyllotheca concinna.	Phyllotheca, sp.	Phyllotheca australis.	Sphenopteris elongata.	Sphenopteris crebra.	Sphenopteris glossophylla.	Sphenopteris, sp.	Odontopteris microphylla.	Odontopteris macrophylla.	Odontopteris, sp.	Merianopteris Major.	Taeniopteris daintreei.	Macrotænopteris wianamattæ.	Pecopteris tenuifolia.	Gleichenia dubia.	Gleichenia, sp.	Podozamites distans.	Podozamites, sp.	Zeugophyllites.	Walchia Milneana.	Walchia, sp.
Wianamatta ...	25 +	...	...	11 +	...	28 +	...	...	...	...	...	15 +	12 +	...	...	...	...	14 +	13 +	34 +	31 +	29 +	30 +	...	...	...
Hawkesbury ...	18 +	...	...	19 +	...	35 +	21 +	8 +	...	...	...	10 +	...	...	9 +	...	...	24 +	...	23 ...	...	22 +	...	...	...	...
Dubbo	26 +	...	...	41 +	27 +	...	...	...	...	...	...	...	...	32 +	...	...	...	...	...	...	...	...	...	...	...	...
Ballimore	...	37 +	38 +	...	...	...	...	...	...	42 +	43 +	...	...	...	...	39 +	...	...	...	...	...	...	...	...	44 +	...
Clarence	5 +	...	...	6 +	...	...	...	...	...	...	...	17 +	...	...	...	...	4 +	...	...	...	...	...	...	33 +	...	48 +
Ipswich	36 +	...	...	47 +	...	45 +	...	...	3 +	...	...	...	...	...	...	...	46 +	40 +	...	...	...	...	...	...	...	...

The figures refer to the notes on the following pages.

NOTES TO TABLE A.

1, 2, 3. Tenison-Woods, Lin. Soc., N.S.W., Vol. VIII., p. 107.

4. Wilkinson. Notes on Geol., N.S.W., p. 55, and in Annual Rep. Dep. Mines, 1880, p. 239. Pittman. Rep. Dep. Mines, 1880, p. 244. Feistmantel, Proc. Royal Soc., N.S.W., 1880.

5. Same refs. as 4. Also Tenison-Woods, Lin. Soc., N.S.W., Vol. VIII., pp. 54-112.

6. Refs. as 4.

8. Notes Geol., N.S.W., p. 54.

9, 10. Ditto, and Feistmantel, Proc. Royal Soc., N.S.W., 1880.

11. Notes on Geol., N.S.W., p. 54. Tenison-Woods. Royal Soc., N.S.W., 1883, p. 82.

12, 13. Notes on Geol., N.S.W., p. 54. Feistmantel. Royal Soc., 1880.

14. Ditto, and Tenison-Woods. Proc. Royal Soc., 1883, p. 82.

15. Wilkinson. Notes on Geol., N.S.W., p. 54.

17. Pittmann. Ann. Rep. Dep. Mines, 1880, p. 244.

18. Tenison-Woods. Royal Soc., N.S.W., 1883, p. 82.

19. Tenison-Woods. Royal Soc., 1883, p. 82. Feistmantel. Royal Soc., 1880.

21. Tenison-Woods. Lin. Soc., Vol. VIII., p. 74. Royal Soc., N.S.W., 1883, p. 82.

22. Royal Soc., 1883, p. 82.

23, 24, 25. Ditto ditto.

26. Lin. Soc., N.S.W., Vol. IX., p. 251.

27, 28, 29, 30, 31. Tenison-Woods. Lin. Soc., N.S.W., Vol. VIII., p. 163. Royal Soc., 1883, p. 82.

32. Lin. Soc., N.S.W., Vol. IX., p. 250.

33. Ann. Rep. Dept. Mines, 1880, p. 239.

34. Feistmantel. Royal Soc., 1880.

35. Tenison-Woods. Lin. Soc., N.S.W., Vol. VIII., p. 75.

36. Refs. as 35, pp. 54-112.

37. Lin. Soc., N.S.W., Vol. VIII., p. 112.

38. Lin. Soc., N.S.W., Vol. VIII., p. 113.

39. Lin. Soc., N.S.W., Vol. VIII., p. 114.

40. Lin. Soc., N.S.W., Vol. VIII., p. 118.

41. Tenison-Woods. Lin. Soc., N.S.W., Vol. VIII., p. 106. Royal Soc., N.S.W., 1883, p. 82.

43. Lin. Soc., N.S.W., Vol. VIII., p. 94.

44. Lin. Soc., N.S.W., Vol. VIII., p. 163.

45, 46. Lin. Soc., N.S.W., Vol. VIII., p. 54.

47. Lin. Soc., N.S.W., Vol. VIII., p. 105, and Carruther's Qutly. Jour. Geol. Soc., Vol. XXVIII., p. 355.

48. Mines and Mineral Stat., 1875, p. 178. (In later editions Mr. Clarke substitutes name Voltzia.)

Age of Formations.—Although lithological resemblances are not always a safe guide in identifying widely separated formations, yet, before any fossils were found, the general opinion was that the Hawkesbury and Dubbo sandstones were of the same age. Fossils have since been discovered which confirm that opinion. The age of the Ballimore coal beds is not so easily determined. As may be seen from table A, Dubbo and Ballimore have not one fossil plant common to the two places. A comparison with Newcastle or Bowenfels is out of the question. No trace of Glossopteris is known from Ballimore. But the general aspect of the Ballimore fossils would lead me to think that Ballimore is a connecting link between the Upper Coal and the Hawkesbury rocks, that is, if the Clarence River beds are really newer than Hawkesbury sandstone.

The following fossils are recorded from the Clarence :—*Alethopteris australis*, *Thinnfeldia odontopteroides*, *Sphenopteris*, *sp.* *Tæniopteris Daintreei*, *Zeugophyllites*, *Walchia.* If we except Tæniopteris they differ in no way from the Hawkesbury fossils. It is not easy to see why the former are considered as of Jurassic and the latter of Triassic age. The table appended (B) shows how the formations referred to in this paper are correlated by living geologists. Hector's views are taken from an article by him in the Geological Mag., Jan. 1882, p. 28. The figures account for the others. It should be remarked that when mention is made of the lower carboniferous at Cowra, the country near that town generally is not to be understood, but only a well-defined belt running north and south, which is well seen on the Grenfel road five miles from Cowra.

TABLE B.

	Wilkinson.	Hector.	Tenison-Woods.
Jurassic			
upper middle lower	Clarence (9)	Clarence Jerusalem Coal. T. Cape Patterson, V.	Hawkesbury & Clarence & Ipswich (1)
oolite lias			Ballimore, Burnett (2)
Triassic	Hawkesbury & Wianamatta (4)	Wianamatta	Newcastle Bowenfels (3)
Permian			
upper	Newcastle & Illawarra (8)	Hawkesbury	Greta, Anvil & Stoney Creeks (4)
lower		Newcastle, Stoney Creek & Wollongong	
Carboniferous			
upper	Greta and Anvil Creeks, West Maitland (7)		
lower	Cowra, Canowindra (6)	Port Stephens	Stroud, Manning, Cowra, Canowindra (5)

Notes to (B) Table.

1. Lin. Soc., N.S.W., Vol. VIII., p. 54-55. Royal Soc., N.S.W., 1883, p. 82.

2. Lin. Soc., N.S.W., p. 53.

3. p. 52.

4. Notes on Geol. N.S.W., p. 53.

5-6. Lin. Soc., N.S.W., Vol. VIII., p. 52.

6-7. Notes on Geol. N.S.W., p. 44.

8. p. 51.

9. p. 55.

Prof. Stephens (Lin. Soc. N. S. Wales, Vol. VIII., p. 527) has reason for thinking that some beds at the Clarence River are of more recent date than are usually supposed. He mentions fossil trunks resembling pines and leaves not unlike some of the *Pandaneæ* and a shell belonging to the *Unionidæ*. The presence of a species of *Unio* could hardly prove anything as to the age of the beds, for the family has a long range in time. The *Pandaneæ* date from Jurassic times, and it will be remembered that *Thinnfeldia* was probably a conifer. It is only fair to state that Prof. Stephens did not mention the fossils in support of the age. He merely recorded their presence.

So far, no two geologists are agreed as to the age of the Hawkesbury sandstone. But all are agreed as to the sequence of the Mesozoic formations, as follows:—Newcastle, Hawkesbury and Wianamatta, and Clarence River. Until I discovered the Ballimore fossils, (which were at once described by the Rev. J. E. Tenison-Woods) I was of opinion that the sequence just named was the true one. Now, I can see no reason for separating the Hawkesbury and Clarence by any great interval, and more, I think the Clarence is the older of the two. The Ballimore coal field with its own marked flora, I take to be older than either. In my opinion this represents the true successions of our Mesozoic rocks, proceeding downwards.

1. HAWKESBURY AND WIANAMATTA—
   With *Alethopteris australis*, *Thinnfeldia odontopteroides*, *Phyllotheca concinna*, *Macrotæniopteris Wianamattæ*, *Podozamites distans*.
2. CLARENCE—
   With *Alethopteris australis*, *Thinnfeldia odontopteroides*, *Sphenopteris* sp., *Tæniopteris Daintreei*, *Zeugophyllites* and *Walchia*.
3. BALLIMORE—
   With *Alethopteris concinna*, *A. currani*, *Sphenopteris crebra*, *S. glossophylla*, *Merianopteris major*, *Walchia milneana*.

4. Glossopteris Beds, Upper Coal Measures—

With *Glossopteris, Vertebraria, Gangamopteris.*

Origin of the Dubbo Sandstone.—Having now described the various appearances and the physical characteristics of the sandstones, we may proceed to enquire if any light can be thrown on their origin. Mr. A. G. Green remarks in his Physical Geology that if accumulations of blown sand be preserved it might be difficult to distinguished them from sandstones formed beneath water, unless they happened to contain land shells or land plants in the position in which they grew. In one respect however, they do differ. The grains are usually far more clearly rounded in blown sand than in subaqueous sandstones. I may state at once that the generally received opinion is that the Dubbo sandstones are like in origin to the sandstones about Sydney—fresh water or estuarine. I have given some attention to the matter, and excepting the fact that the stratification and false bedding are not unlike the stratification and false bedding exhibited in well known subaqueous rocks, there is no evidence whatever to offer in support of such an origin.

Fossils are plentiful enough, but they are *all* land plants. They are in such a wonderful state of preservation and so perfect (as the members will remember from specimens exhibited at a former meeting) that they could not have been drifted from any distance —they must have grown where we find them. The thin seams of coal represent old land surfaces. No fresh water or marine fossil has ever been discovered. As far as the evidence goes, we are only justified in considering the formation as *Terrestrial* in its origin.

The views, and the arguments by which they are supported, of the Rev. J. C. Tenison-Woods are too well known to require more than a reference here, but I may state that, as far as my observations go, no difficulties more weighty than those already urged will be furnished by the Dubbo rocks. It has been suggested in Mr. Tenison-Wood's paper that were it not for internal metamorphism the appearance of the sand grains would afford a clue to the origin of the sandstones. Daubrée, Sorby and Phillips all agree that blown sand, by its rounded and abraded particles can be distinguished from river-borne and other subaqueous sands. In the case of the Hawkesbury sandstone the once abraded and rounded grains may have been subjected to such conditions as would induce subsequent crystallisation. But we are aware of no means by which angular or crystalline particles could become rounded after deposition. A few rounded and abraded grains, even when the great mass of the rock is crystallised, would, to my mind, go far to uphold the Æolian theory, more especially when considered in the light of other facts equally significant. Rounded and abraded grains are to be found in the Dubbo sandstones. The slide I exhibit is a fairly typical one. The sand grains were well washed and spread on paper previously brushed over with gum. Portions containing seemingly abraded particles were then cut from the sheet.

Mr. J. Milne, in his notes on the Sinaitic Peninsula (Q. J. G. Soc., Vol. XXXI., p. 18.) mentions the definite character which blown sand gives the scattered stones in the desert about Nackhl. All have a peculiar polish, looking as if they had been smeared with grease, a lustre nearly represented in the fractured surface of some specimens of witherite. Should these stones, he remarks, become buried, future investigators will find in them marks as clearly indicative of their origin as the rounded forms of water-worn pebbles or the angular and scratched faces in beds of glacial drift. Just as we infer from the latter, the existence of former glaciers, so they will infer the former presence of deserts and "sand-drifts." The pebbles in the Dubbo sandstones, when cleared of the minute particles (quartz or decomposed felspar) adhering to the surface, have in very many instances that I have noticed, an appearance that rolling in water could never give them. But whether these may not be water-worn grains chemically corroded on the surface I am not prepared to say.

Another point worth considering is the great difference between the normal sandstone and those portions of it, which have undoubtedly been deposited in water. We often see beds of shale which split up into thin laminæ. This fissile structure is due to plates of mica which are visible on the fresh surfaces. Wind could not induce such a structure, unless the sand and mica were drifted into quiet water. This is exceptional, and very different from the greater part of the rock, where the mica is uniformly and sparsely distributed throughout the mass.

Richthofen describes a wind blown deposit (unstratified) in China, more than 1500 feet in thickness. He refers this to an origin wholly æolian, and calls it by the name of land-lœss, to distinguish it from like deposits in which water has co-operated. The latter he calls *lake-lœss.* I consider the sandstones at Dubbo to be a lake-lœss formation. Further research may find material for another view, but with the materials in hand it would hardly be justifiable to come to any other conclusion.

I may here observe that in the discussion on Mr. Tenison-Wood's paper, mention was made of recognising hyalite in thin slices of the rock. I have succeeded in preparing a few sections, which I now exhibit. The cohesion between the particles is, as a rule, so slight, that sections cannot be prepared except where metamorphism has more than ordinarily affected the rock. Unfortunately these sections give us no idea of the original structure. In the sections I lay before you the partly formed crystals as are close as the constituents of a ternary granite.

Origin of the Ironstones.—Beds of Ironstone are found at various levels in the series, but not to any considerable extent, except on the Talbragar River up and down from Ballimore. At the last named place (*vide* section above) it occurs in beds and lenticular masses, which leave no doubt as to its origin. It would be hard to find a better example than Ballimore, to illustrate the process so clearly put by Dr. S. Hunt in his "Origin of Metalliferous Deposits" (Chem. and Geol. Essays, p. 228). Every bed of ironstone marks an old surface as surely as every coal bed does. The bands of ironstone, never more than a few feet thick, represent shallow "lagoons" which held ferruginous water, derived from the surrounding rocks, through the agency of decaying organic matter. It might be said that every bed of iron represents a bed of coal.

Nodules of ironstone are found in the river drifts. When broken they exhibit a banded structure following the contours of the exterior—due to the change at various intervals of the ferrous carbonate into limonite.

Economic Geology.—About four years ago a sudden fresh removed a considerable amount of sand from the bed of Spicer's Creek near the point where the main road from Wellington crosses that creek. The *surface* of a bed of coal was in this way laid bare. A rude opening such as means at hand would allow, was made and I measured a seam thirty-seven inches in thickness, without going through the coal. Since then a seam 49 inches has been measured near the same place—probably the same coal. It has never been worked. Nearer to Dubbo, at Ballimore, several shafts have been put down, but although coal has been met with in every instance, the seams were thin. The quality of the coal has not been found fault with. It is bituminous and burns to a soft grey ash. The proportion of fixed carbon is small and as the coal does not cake it does not produce a true coke. An analysis, it is said, gave the following result:—

Water...	6·5
Vol. Hydrocarbons	45·4
Fixed Carbon...	37·6
Ash	10·5

It makes a good household coal and is no doubt suitable for stationary engines, but it would be less satisfactory in the case of locomotives. It easily breaks into small cubical fragments, which would be blown by the powerful blast through the boiler tubes. Efforts have been made in other localities to get payable coal, but the work has been undertaken in a most arbitrary manner, without theoretical or practical knowledge of coal mining. A slight acquaintance with the geology of the district would in most instances have saved a useless expenditure of money. There is every reason to believe that payable coal will yet be found. The physical features of the district are eminently favourable to the miner, as the rocks are not disturbed to a great extent. Trap is not so plentiful as to materially affect the coal, so that there will be few or no difficulties to contend with.

The outcrop of the coal on Spicer's Creek is near the edge of the coal "basin." A series of borings from this point following the dip of the beds would be the most effective method of proving that portion of the country.

Fireclay.—Thick beds of fireclay underlie the coal and ironstones at Ballimore. It is true that some specimens, sent to experts, were considered hardly suitable for the manufacture of fire-bricks. But it has been remarked that though chemical and mineralogical examination will often enable us to say that certain clays will assuredly not make fire-bricks; and that other clays are promising enough to make it worth while trying them; yet nothing short of making a test brick will settle the question. No bricks have been made as yet.

Freestone.—The sandstone is quarried in a few places for building stone. The best procurable is more friable and less ferruginous than Pyrmont stone, nor will it bear an equal weight. In fact the normal sandstone is hardly more than a mixture of quartz grains, decomposed felspar and mica, without any chemical union. In the proximity of basalt it is altered and more compact, and often changed into a quartzite, as at Barbigal and Dalton's Paddock, near the general cemetery. From some experiments I made with the building stone, I found that blocks of a cubic inch placed in water to a fourth of their depth, absorbed more than one-half of their own volume of water. Cubes repeatedly saturated with a solution of common salt lose their angles, and when treated in the same way with sulphate of soda rapidly disintegrate. The altered sandstones already referred to as quartzite, make a building stone durable as granite.

Granite.—It is well exposed on the the railway at 289·10 miles. It is a ternary granite, hornblende replacing the mica to a great extent. It takes a fine polish, having a slightly bluish tinge. Nothing shows how compact the crystals are better than the quality it possesses of holding together when reduced to thin slices for microscopic examination. In the near future it will be used for building purposes, as it is unquestionably the most durable stone about Dubbo. The rock as seen in the railway cuttings is traversed by numerous joints, that will facilitate the working.

Basalt.—The Dolerite about Dubbo is not sufficiently exposed to encourage its being sought as a building stone. For road purposes there is practically an unlimited supply within the circuit of a mile from the town.

Gold.—Gold has been worked, but in every instance outside the limits of the sandstone rocks, except when, as it often happens, the older rocks drain across them. Auriferous quartz reefs have been worked at Tomingly to the south west.

Iron.—The only source of iron known is the clay iron stone already described. It is best seen along the valley of the Talbragar. Taken with the coal and limestone, which is within easy reach, it may prove valuable.

Copper, galena, diamonds (from the gravel in old river beds), topaz and opal have been met with, but not in quantities of any "economic" value.

The microscopic character of the granites and basalts is reserved for another and concluding paper on the Geology of Dubbo.

NOTES AND EXHIBITS.

Mr. Macleay exhibited in illustration of his Paper on the Genus *Lamprima*, all the known species of the genus, excepting *L. Krefftii*, the type of which is in the Australian Museum. Mr. French's beautiful species *L. Muelleri* excited much attention.

Dr. von Lendenfeld exhibited a Syphonophore of the Genus *Diphyes*, found at Bondi by Mr. Whitelegge.

Mr. Masters exhibited well mounted specimens of two very rare Australian Butterflies, *Xenica Kershawi* from Victoria, and *Heteronympha Digglesi* from Five Dock, near Sydney.

Mr. Macleay read a note from Mr. Wilkinson, enclosing the following notes on the habits of the Aborigines, by Dr. Turner, Bishop of Grafton and Armidale :—

ARMIDALE, *April 18th, 1885.*

C. S. WILKINSON, ESQ.

DEAR SIR,—At p. 436 of Vol. 8, p. 4 of the Linnean Society of N.S.W., is a brief paper by yourself upon a custom of the Aborigines in the Mount Poole district, and as an accident enables me to say something about a like custom among the Armidale blacks, I venture to submit a short statement to you. Walking some years ago in the bush, a mile or so out of Armidale, I picked up a black-fellow's dilly-bag, I forget now what the nature of its general contents was, but in it was a stone apparently of yellowish calcareous crystals, very dirty; as I thought it was hardly likely such a stone would be preserved without some reason for its preservation, I kept it and waited an opportunity of enquiry as to its purpose. Some months after a blackfellow came about my house and I showed him the stone and asked him what it was for; he said at once it was to obtain water, and volunteered the statement that the gins were not allowed to look at it, they had to carry it but not to look at it on any account. It was a remarkable stone, and when I went to England I took it with me, meaning to give it to some Public Museum, but I am almost afraid it never got there. The stone, as well as I can remember, was about 3 in. or 3¼ in. long, 1¼ in. thick, and nearly 3 in. deep.

Mr. E. P. Ramsay exhibited (1) on behalf of Mr. K. H. Bennett, of Mossgiel, the eggs of *Falco subniger*, and of the *Glareola grallaria*, mentioned in his paper; also the following rare eggs :— (2) *Gypoictinia melanosternon*, *Menura victoriæ* and *Astur radiatus*. (3) Some new birds from the Astrolabe Range of New Guinea, including the following :—*Parotia lawesii*, a small but distinct species allied to *P. sexpennis* ; *Lophorina superba minor*, a small form of *Lophorina superba* ; a male and female of a species of *Gallus*, jungle fowl, remarkable for the great development of the spurs, and apparently different from all other varieties. (4) A new and beautifully marked species of *Retaster*, recently dredged in Port Jackson. (5) A new Bat, *Taphozous*, sp., received from Mr. G. Barnard, from the Dawson River. He also, on behalf of Mr. Smithurst, exhibited some interesting and rare semi-fossil shells from the Muddy Creek deposits, near Hamilton, Victoria, among these were a new species of *Trigonia*, a new *Telicaria*, a fine large perfect specimen of *Murex areolatus* and *Voluta undulata*, Lamarck.

Dr. J. C Cox exhibited a sandstone nodule, the outer crust of which to a considerable depth was stained with iron, the original colour, as shown by the central portion, having been white. Also a large *Cephalopod*, belonging to the family *Sepiadæ* and genus *Sepia*, which had been recently presented to the Australian Museum, by the Hon. William Macleay. This unique specimen is about three feet long from the hinder part to the apex of the arms, the body is about eighteen inches long, and eighteen inches broad, deeply notched at the lower margin and peaked in the centre at the neck, and arched on each side; the head is about eighteen inches from the body to the apex of the arms. It is of a dark brown olive colour, quite smooth, the tentacles are about two feet long, the cups on the arms do not correspond with any known species, nor do the cups on the tentacles; it is very like *Sepia tuberculata* of Lamarck, but no tubercles exist on the surface and it is much longer. *Sepia vermiculata* of Quoy and Gaim., is very like it, but is only fifteen inches long; most of the species however of the Genus, have been described from the shell.

Mr. Palmer exhibited foliage of Peach tree affected by a small fungoid growth; also a small branch of *Grevillea robusta* attacked by a species of *Tinea;* an Orange branch attacked by black blight and coccus; an Apple stem and leaves attacked by American blight, and a Quince fruit destroyed by a species of weevil.

Mr. J. Douglas-Ogilby exhibited a species of *Platycephalus*, which he believed to be new. From its unusually strong dentition he proposes for it the name *Macrodon*. He purposes to describe it at next Meeting.

WEDNESDAY, 27TH MAY, 1885.

The President, Professor W. J. Stephens, F.G.S., in the chair.

The Rev. W. W. Gill was present as a visitor.

MEMBERS ELECTED.

Mr. Frederick Wright, Lecturer on Materia Medica to the Pharmaceutical Society; Mr. Henry Prince.

DONATIONS.

"Zoologischer Anzeiger," No. 191. From the Editor.

"Bulletin de la Société Royale Botanique de Belgique." Tome XXIII., 1884. From the Society.

"Guide to the Galleries of Mammalia in the Department of Zoology," and "Catalogue of Lizards," Vol. I. From the British Museum.

"Abhandlungen aus dem Gebiete der Naturwissenschaften herausgegeben vom Naturwissenschaftlichen Verein in Hamburg." Band VIII, Heft I., II. and III. From the Society.

"Natuurkundig Tijdschrift." Achtste Serie, Deel V. "Catalogus der Bibliotheek," "Boekwerken." July and December, 1884. From the Koninklijke Natuurkundige Vereeniging in Nederlandsch-Indië.

"Abstracts of Proceedings of the Royal Society of Tasmania." April 14th and May 12th, 1885. From the Society.

"Bulletin de la Société Impériale des Naturalistes de Moscow." Tome LIX., No. 2, 1884. From the Society.

"Bulletin of the California Academy of Sciences." Nos. 2 and 3. January and February, 1885. From the Director.

"Annual Report of the Trustees of the American Museum of Natural History." 1884-5. From the Trustees.

"Journal of the Cincinnati Society of Natural History." Vol. VIII., No. 1. April, 1885. From the Society.

"Proceedings of the Academy of Natural Sciences of Philadelphia." Part III. November and December, 1884. From the Academy.

"Science." Vol. V., Nos. 110-113. From the Editor.

"Bulletin de la Société Royale Belge de Géographie." No. 1, January and February, 1885. From the Society.

"Feuille des jeunes Naturalistes." No. 174. From the Editor.

"Victorian Naturalist." Vol. II., No. 1. From the Field Naturalists' Club of Victoria.

"Monatliche Mittheilungen des Naturwissenschaftlichen Vereins des Regierungsbezirkes Frankfurt." 2 Jahrg., No. 12. From the Society.

Harris's "Aurelian." From the Hon. William Macleay, F.L.S., &c.

"Directions for Collecting Micro-lepidoptera." By Lord Walsingham. From John Brazier, Esq., C.M.Z.S.

"Mémoires de la Société de Physique et d'Histoire naturelle de Genéve." Tome XXVIII., Pt. 2. From the Society.

"Verslagen en Mededeelingen." Parts XIX and XX., 1884. "Jaarboek." 1883. From L'Academie Royale des Sciences, Amsterdam.

"Journal of Conchology." Vol. IV., No. 9. From the Conchological Society of Great Britain and Ireland.

"Leopoldina." Hefts XII., XVII., XX. "Nova Acta." Band XXXVII., Nos. 4, 5, XXXVIII., Nos. 2, 3, 5, XXXIX., Nos. 1, 3, 4, XL., Nos. 1, 2, 3, 5, 7, XLI., Pt. I., No. 4, Pt. II., Nos. 2, 3, 4, 5, XLII., Nos. 2, 3, 5, XLIII., Nos. 1, 2, 3, 7, XLIV., No. 2. From the Carolinischen Deutschen Akademie der Naturforscher zu Halle.

"Note regarding the Silurian Fossils of the Gordon Limestones." By Robert M. Johnston, F.L.S. From the Author.

"Catalogue of Birds in the British Museum." Vol. X. From the Trustees.

"Journal de Conchyliologie." Tome XXIV., Nos. 1, 2, 3, 4. 1884. From the Directors.

"Tijdschrift voor Entomologie." Deel XXVII., Pts, 3 and 4. From the Entomological Society of the Netherlands.

PAPERS READ.

NOTE ON THE BRAIN OF *HALICORE AUSTRALIS.* Owen. (1)

By N. de Miklouho-Maclay.

(Plate XXIV.)

During a visit to the Islands of Torres' Straits in April, 1880, I had the opportunity of obtaining on the Island Mabiak (2) a head of a Dugong, for the purpose of studying its brain.

I received the head a very few hours after the animal was killed, and proceeded, without delay, to secure the brain. It took me some time to free the skull from the very thick skin (3) and the muscles of the neck. Being anxious not to injure the brain, and not having examined sections of the skull of *H. Australis* before, I thought it safer to make, instead of the stereotyped circular cut of the cranium, a median longitudinal section of the same, which process, however, required time and patience on account of the very dense texture of the bones of the skull.

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(1) Prof. Owen separated the *H. Australis* from the *H. indicus* on account of specific distinctions as: the difference in dental formula and of certain osteological characters. [Vide: Notes on the characters of the skeleton of a Dugong (*Halicore Australis*) by Professor Owen, F.R.S.; published as an Appendix (No. IV.) of the Narrative of the Surveying Voyage of H.M.S. Fly, by T. Beete Jukes, London, 1847, Vol. II., p. 326.]

(2) The Dugong is still very plentiful in Torres' Straits and on the south coast of New Guinea, where the natives catch them with big nets and kill them by keeping the Dugong under water until he is drowned. The flesh of the Dugong is relatively good to eat (when you have nothing better), it is like beef, but rather coarse and dark.

(3) The thickness of the skin of the neck and the back, after it had been tanned, (for which purpose the skin had to remain about 10 months in the pit) was over 25 mm. (or over 1 in.)

I was able at last to saw the skull through, and made with a long sharp scalpel the median section of the brain, which proved to be in the most perfect (fresh) condition for examination. A sketch of the section was made at once, because I had no means of preserving the brain *in the skull* in alcohol, and I knew that it would be greatly distorded by the taking it out from the cranium.

I extracted, as carefully as I could under the circumstances, (sacrificing, however, the pituitary body and the pineal gland), the two halves of the brain from the cranial cavity and kept them well surrounded with wadding for a few days in strong alcohol of about 90 %.) My time at Mabiak being very fully occupied, I contented myself as regards the Dugong's brains, with the sketch above mentioned and a few remarks in my diary. As the brain appeared to me sufficiently hardened I embedded it in wadding and a piece of soft calico, and left the small parcel amongst other anatomical specimens in a jar (filled with alcohol of about 40 %) waiting my leisure and opportunity for further examination. [I mention all these details because I know too well how much the value of anatomical investigations depends upon *the state* of the investigated material.]

A few weeks ago unpacking some of my New Guinea collections, I came across the packet with the Dugong's brain which proved to be in a very good state of preservation, and not being aware of a description of the brain of *Halicore* (1), decided to complete the examination of it. Of course its having remained for 4 years in alcohol had some effect upon the brain, and still more the removal of it from the cranial cavity.

The comparison of the two representations of the *same* median section (fig. 3 and fig. 4) shows the effect of the long preservation on some parts of the brain, [bending of the corpus callosum, stretching the crura cerebri, &c., &c.] After these preliminary explanations I shall proceed to make a few remarks in explanation of the adjoining figures on plate XXIV.

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(1) The brain of *Manatus americanus* has been described by Dr. Murie (Transactions of the Zoological Society, VIII., p. 127) and by Mr. A. H. Garrod (Transactions of the Zoological Society, X., p. 137. Shaded outlines with reference to the shape of the upper surface of the brains of : *Manatus*, *Halicore*, *Rhytina* are given in Brandt's Symbolæ Sirenologicæ (Mem. de l'Acad. Imp. des Sciences de St. Petersbourg. Tome XII., (1868), p. 284.

Already the first examination of the brain at Mabiak showed me after the removal of the very thick pia mater, that the surface of the hemispheres was smooth, without convolutions, with the exception of a transversal depression on the sides in the middle of the hemispheres and a deep fissure corresponding more or less to the fissura Sylvii. These fissures are short and differently shaped on the two sides. (Fig. 1 and Fig. 2.) Examined from below there are two other sulci, the sulci olfactorii running obliquely forward and covered with the broad tracti olfactorii.

Horizontal sections of the hemispheres show thin walls and extensive lateral ventricles, the lumen of which has been, in the specimen in question, very much reduced by collapsing of the thin walls. It is only a result of the mode of preservation: should the brain have remained in the cranium in situ, the walls of the hemisphere would have kept their shape, maintained in their natural position by the membranes and blood-vessels of the brain.

I have specimens of sections of different brains in situ *in the skull* which have kept for years their shape and very nearly their size.

The corpus callosum covers the thalami optici (fig. 3), the columns of the fornix, the septum lucidum (1) and the hippocampus major are well developed. The anterior white commissure is not large but quite distinct. The upper surface of the comparatively big thalami optici with a large commissura mollis are covered with the ample folds of the choroid plexus which is closely connected with the epithelium of the third ventricle. (Fig. 2.)

The anterior tubercle and the pulvinar are separated by a distinct oblique groove.

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(1) In my notes made at Mabiak, I find no mention of a ventricle of the septum lucidum and at present it is impossible to decide with certainty about its prior existence and extent.

The corpora quadrigemina are not large and on the median section show that the aqueductus Sylvii extends into a narrow triangular cavity. The posterior wall of the corpora quadrigemina is rather thin.

The Cerebellum examined from behind is divided into some 10 portions (fig. 5) which divisions however, are rather superficial, as can be seen on the horizontal section of cerebellum. (fig. 6)

The deepest fissures are to be seen on the median section (fig. 3 and fig. 4) and divide the cerebellum (examined on the median section) into 3 lobes, of which the anterior is the largest. Corresponding to the lobes the stem of the white substance ramifying in the arbor vitæ is divided into 3 principal branches.

The pons Varolii is well developed.

The principal object of the publication of these few remarks about the brain of *H. Australis* is the hope, that they may induce anatomists in Australia, who may have ample opportunity (on the coast of Queensland, even in Brisbane) to obtain the Dugong, to fill up the numerous gaps in these notes which being the result of the dissection of *one* brain are necessarily incomplete.

EXPLANATION OF PLATE XXIV.

(All the figures Nat. Size.)

Fig. 1.—Brain of *Halicore Australis*, Owen, from the side. II.—n. opticus, V.—n. trigeminus.

Fig. 2.—The left hemisphere of the same brain from the other side to show the different shape of the deep lateral fissure (fissura Sylvii). I.—Tractus olfactorius.

Fig. 3.—Rough sketch of the median section of the same brain made at Mabiak, showing the same *in situ*, in the cranium. The falx is covering a great part of the hemisphere.

Fig. 4.—The same section, after a photograph taken in Sydney from the same object, about four years later.

Fig. 5.—Diagramatic view of the cerebellum of the same brain from behind.

Eig. 6.—Horizontsl section of the cerebellum, the position and direction of which is indicated by the dotted line (* *) in Fig. 1. To—Thalami optici, cq—Corpora quadrigemina, v—Fourth verticle.

RECORD OF A REMARKABLE HALORAGIS FROM NEW SOUTH WALES.

By Baron von Mueller, K.C.M.G., M.D., Ph.D., F.R.S., &c.

Haloragis monosperma.

Erect, quite glabrous, leaves rather small, on numerous abbreviated branchlets crowded, all opposite linear-lanceolate, almost sessile, nearly flat, scantily denticulated towards their summit; floral leaves also opposite, gradually shorter, but only the uppermost reduced to bracts; flowers solitary or two together in the axils of the upper leaves, the terminal and sub-terminal flowers spicate; all on very short stalklets; lobes of the calyx four, deltoid; petals boat-shaped, smooth; anthers much elongated, very narrow; styles four; stigmas pyramidal, semi-ovate, not downy; ovary four-celled; fruit almost hemiellipsoid, quadrangular, considerably longer than broad, slightly tubercular, one-seeded; pericarp crustaceous, under the adnate calyx-tube eight furrowed.

On heaths at the western side of ranges near Braidwood, at an elevation of about 3,000 feet; W. Bäuerlen, who from the same region brought *Boronia rhomboidea*, *B. pilosa*, *Mühlenbeckia stenophylla*. *Pomaderris phylicifolia*, *Didiscus humilis* and *Uncinia tenella*. Height of the plant above one foot; branchlets quadrangular; majority of leaves varying in length between ½ and ¾ inch, somewhat concave, more crowded than those of most other species. Fruit bearing calyx fully one-sixth of an inch long; seed central. The characteristic of the one-seeded fruit is exceptional in the genus, but may not be absolutely constant, as the ovary is four-celled. This species is in some respects allied to *H. lanceolata*, but must systematically be placed near *H. salsoloides*, from which it differs in being of much more robust growth and perfectly glabrous, in more numerous much larger and particularly broader leaves, and perhaps also in form and structure of the fruits, that of *H. salsoloides* remaining still unknown.

The same collector, while under engagement to the writer, has afforded the opportunity of recording most of the following plants as recently traced to far southern localities in New South Wales:—

Hibbertia saligna ; Clyde.
Dysoxylon Muelleri ; Currawang.
Bertya gummifera ; Braidwood.
Casuarina nana ; Genoa.
Dodonæa multijuga ; Shoalhaven.
Mirbelia grandiflora ; Braidwood.
Bossiæa Kriamensis ; Braidwood.
Albizzia pruinosa.
Acacia vestita ; Genoa.
Acacia glaucescens ; Genoa.
Eucalyptus stricta ; Candelo.
Schizomeria ovata ; Braidwood.
Actinotus Gibbonsii : Genoa.
Astrotricha longifolia ; Currawang.
Cryptandra Scortechinii ; Braidwood.
Petrophila sessilis ; Braidwood.
Persoonia lanceolata.
Persoonia oxycoccoides.
Hakea saligna : Mount Dromedary.
Pimelea collina ; Braidwood.
Glossogyne tenuifolia ; Clyde.
Chilocarpus australis ; Bulli.
Polymeria calycina ; Clyde.
Chloanthes parviflora ; Braidwood.
Ruellia australis ; Shoalhaven.
Prostanthera Sieberi ; Genoa.
Epacris Calvertiana ; Braidwood.
Dendrobium Beckleri ; Milton.
Dendrobium teretifolium ; Clyde.
Thelymitra virosa ; Braidwood.
Hæmodorum planifolium ; Clyde.
Dianella cærulea ; Braidwood.
Xanthorrhæa hastilis ; Genoa.
Juncus vaginatus ; Braidwood.
Aristida ramosa ; Braidwood.
Agrostis breviglumis ; Braidwood.

The above named *Eucalyptus stricta* was found by Mr. Tyrone White ; *Hakea saligna,* by Miss M. Bate ; *Chilocarpus australis,* by Mr. W. Kirton. In all now of more than 200 New South Wales plants have records been given during the last few years in the transactions of the local Linnean Society as regards their approximate southern limits.

TWO NEW AUSTRALIAN LUCANDLÆ.

BY WILLIAM MACLEAY, F.L.S., &c.

In the preparation of the Paper which I read at last Meeting, on the genus *Lamprima*, I was necessarily led to make a close examination of all the Australian Pecticorns in my cabinets. The result has been the discovery of two very remarkable insects, hitherto I believe quite unknown. For one of these I am compelled to form a new genus, it differs so widely from any previously described; the other, though also of most distinctive and peculiar appearance, may, I think, be very properly placed in the genus *Rhyssonotus*

HOMOLAMPRIMA. nov. gen.

Mentum triangularly rounded in front, slightly transversal.

Labium extending prominently beyond the mandibles.

Maxillæ prominent, apparently corneous, hidden in long hair.

Palpi strong, rather short.

Mandibles short, exserted, not bearded on the inside.

Head small, subquadrate.

Eyes transversal, entire.

Antennæ short, stout, the first joint clavate and about the length of the next six united, the three last forming a foliate club.

Prothorax slightly convex, very slightly angled on the sides.

Elytra slightly convex.

Prosternum rather broad between the fore legs, terminating behind in a prominent round point.

Mesosternum terminating in front in a broad crescent shaped emargination, as if to receive the prosternal process.

Legs rather slight, the fore tibiæ armed externally.

I scarcely know to what group of the Lucanidæ to refer this genus. In its narrow head, general form, and metallic colouring, the insect shows an affinity to the *Lamprimidæ*, but on the other hand, its distant fore legs, broad prosternum and curiously formed mesosternum seem to indicate an approach to the true *Lucanidæ*. I regret that having only one specimen, I have been unable to examine the maxillæ and labium in a satisfactory way.

HOMOLAMPRIMA CRENULATA. n. sp.

Male. Of a rather depressed ovate form. The upper surface dull bronzy black, with metallic reflections on the margin of the thorax and elytra, and on the whole of the scutellum. The under surface, legs, mandibles and antennæ are of a brilliant metallic bluish-green. The head is square, rugose, broadly and triangularly but not deeply depressed, and coarsely and profoundly punctate. The mandibles are shorter than the head, punctured above, smooth on the sides, and curving a little upwards and inwards towards the apex where the two terminal teeth of each mandible come in contact. The thorax is broader than long, narrowed a little at the apex with the anterior angles a little prominent, rounded on the sides which are crenulated, slightly bisinuate at the base, very finely and thinly punctate, and with a slight depression near the base of the median line. Scutellum smooth, triangular, the sides rounded. Elytra about the width of the thorax, and about twice its length with a few obsolete striæ near the suture, and with the whole surface rather thinly sprinkled with minute variolose-looking punctures. The under surface is mostly smooth; the chin is rugosely punctured; the pro- and meso-sternal processes are smooth; the fore tibiæ are armed externally with four strong teeth, three near the apex, and one above the middle, the other tibiæ have each a small tooth on the outside near the middle.

Length, 9 lines.

Hab.—Clarence River.

Female. I have in my collection one specimen of a female, which is undoubtedly of this genus, and which I think is almost certainly the female of the species just described, but I have no certain proof of the fact. It is longer, broader and slightly flatter than the male insect, is of a dark metallic green on the head and thorax, which are densely punctate, the elytra are of a purplish blue; the fore tibiæ are sexdentate externally and the mandibles are very short. In all other respects it is exactly like the male specimen described above. I cannot give the exact habitat of this specimen, as it is only labelled "New South Wales," but it is probably also from the Clarence River District.

RHYSSONOTUS LATICEPS. n. sp.

Black, nitid, slightly convex. The head is very short and very broad, the anterior angles extending laterally to the width of the thorax; its anterior margin is nearly straight, and its upper surface is very rugose and densely punctate, with an elevation in the middle terminating in two small tubercles, and with a depression on each side. The mandibles are twice the length of the head, broad, very roughly punctured, pilose, curved upward a little at the apex, and armed on the inner side with several obtuse teeth. The antennæ are short, the club consisting of six joints. The mentum is triangular, and immediately behind it, on the jugulum, there is a large compressed transverse tubercle. The eyes are completely divided. The thorax is finely and sparingly punctate, broader than the length, and of the same width as the triangular extension of the head; the sides are parallel, the apex and base almost truncate, the posterior angles excised, and the median line deep, with a fovea on each side near the middle. The scutellum is transversely rounded and punctured lightly. The elytra are of the width of the thorax and not twice the length, profoundly striato-punctate, with the four of five interstices nearest the suture, smooth and convex near the base. The under surface is minutely punctate and rather pilose. The fore tibiæ are armed externally with four rather small teeth, the middle tibiæ with one.

Length, 9 lines.

One specimen, a male, is all I have ever seen of this strange looking insect. It is labelled "New Holland," and has evidently been in the old Macleay collection for a very long time.

The shape of the head, and the sculpture of the elytra, give it a very different aspect from either *Rhyssonotus nebulosus* or *jugularis*, but it has notwithstanding a considerable affinity to the latter of these. The only other known species, *Rhyssonotus parallelus*, described by Deyrolle, in the "Ann. de la Soc. Ent. de France," from a female caught in 1881, I have never seen, but from the description and figure it seems in its parallel form to resemble a little the present species. The resemblance, however, does not extend beyond this, and it seems to me extremely unlikely, therefore, that they are the sexes of the same species.

A LIST OF THE CUCUJIDÆ OF AUSTRALIA, WITH NOTES AND DESCRIPTIONS OF NEW SPECIES.

By A. Sidney Olliff,

Assistant Zoologist, Australian Museum.

In the following Paper, which is the first of a series I intend to offer for publication in the Proceedings of this Society, I have endeavoured to give a complete list of the Cucujidæ of Australia, as far as they are at present known, together with such notes on their structure and synonymy as were made whilst determining the species in the collection of the Australian Museum.

Sixteen genera are contained in this list, comprising forty-six species, a number which can only be regarded as showing our ignorance of the Australian Members of this family; of these species, ten are here described for the first time, and four, viz., *Læmophloeus testaceus*, *Silvanus surinamensis*, *Nausibius dentatus* and *Cryptamorpha Desjardinsii* are almost undoubtedly imported. The last mentioned species is especially interesting as it has been received from widely remote parts of Australia, and even appears to have established itself in Lord Howe Island, where, I am informed, it is usually found on the banana-trees.

The genera *Tristaria* and *Omma*, referred to this family by their authors, are not included here; the former is allied to *Hypocoprus*, which has been placed by Dr. G. H. Horn in the tribe Myrmechixena of the Mycetophagidæ, and the latter is now generally considered to belong to the Cupesidæ.

The following typographical enumeration of the species will serve to show their geographical distribution :—

	Name of Species.	Australia, no exact locality	Cape York and N. Australia.	Port Denison.	Wide Bay & Moreton Bay Dist.	Rich. and Clar. R. Dist.	Hunter R. Dist.	Sydney Dist.	Illawarra and Monaro Dist.	N. S. Wales.	Victoria.	South Australia.	West Australia.	Tasmania.	Lord Howe Island
1.	Passandra marginata, *Gr.*	*	...	...	...	...	...	...	...	...	...	...	...	...	...
2.	Hectarthrum brevifossum, *Newm*	...	*	*	*	...	*	*	...	*	*	...	*	...	...
3.	Ancistria retusa, *Fabr.*	...	*	...	...	...	...	...	...	...	...	...	...	*	...
4.	Prostomis Atkinsoni, *Wat.*	...	...	...	...	...	...	...	...	...	*		...	*	...
5.	,, cornutus, *Wat.*	...	...	...	...	...	...	...	...	...	...	*	...	*	...
6.	Bessaphilus cephalotes, *Wat.*	...	...	...	...	...	...	...	...	...	...	...	...	*	...
7.	Cucujus coloniarius, *Olliff*	...	...	...	...	...	...	...	*	*	...	...	...	...	...
8.	Ipsaphes mœrosus, *Pasc.*	...	...	...	...	*	...	*	*	*	...	...	...	*	...
9.	,, bicolor, *Olliff*	...	...	...	...	...	...	*	*	*	*	...	...	...	...
10.	Platisus obscurus, *Erich.*	...	...	...	...	...	*	*	*	*	...	...	...	*	...
11.	,, integricollis, *Reitt.*	*	...	...	...	...	...	...	...	...	...	...	...	...	...
12.	,, angusticollis, *Reitt.*	*	...	...	...	...	...	...	...	...	...	...	...	*	...
13.	Læmophlœus amabilis, *Olliff*	...	...	...	*	...	...	*	...	*	...	...	...	...	...
14.	,, Ramsayi, *Olliff*	...	...	...	*	...	...	...	...	...	...	...	...	...	...
15.	,, tuberculatus, *Gr.*	*	...	...	...	...	...	...	...	...	...	...	...	...	...
16.	,, tasmanicus, *Gr.*	...	...	...	...	...	...	...	...	...	...	...	...	*	...
17.	,, articeps, *Olliff*	...	...	...	*	...	...	...	*	*	...	...	...	...	...
18.	,, contaminatus, *Gr.*	...	...	...	*	...	...	...	...	...	...	...	...	...	...
19.	,, conterminus, *Olliff*	...	...	...	*	...	...	...	*	*	...	...	...	...	...
20.	,, testaceus, *Fabr.*	...	...	...	...	...	*	*	*	*	...	...	...	*	...
21.	,, Macleayi, *Olliff*	...	...	...	*	...	...	...	...	...	...	...	...	...	...
22.	,, bistriatus, *Gr.*	...	...	...	...	...	...	...	...	*	...	...	...	*	...
23.	,, leachii, *Gr.*	...	...	...	...	...	...	...	...	*	...	...	...	...	...
24.	,, rigidus, *Olliff*	...	...	...	...	...	...	...	...	...	...	...	*	...	...
25.	,, insignis, *Gr.*	...	*	...	...	...	...	...	...	...	...	...	...	...	...
26.	,, lepidus, *Gr.*	...	*	...	...	...	...	...	...	...	...	...	...	...	...
27.	,, parvulus, *Gr.*	...	*	...	...	...	...	...	...	...	...	...	...	...	...
28.	Dendrophagus australis, *Erich*	...	...	...	*	...	*	*	*	*	*	*	...	*	*
29.	Brontes Macleayi, *Olliff*	...	*	...	...	*	...	...	...	*	...	...	...	...	...
30.	,, lucius, *Pasc.*	...	...	...	*	*	...	*	*	*	*	...	...	*	...
31.	,, australis, *Erich.*	...	...	...	...	...	...	...	...	...	...	...	...	*	...
32.	,, denticulatus, *Smith*	*	...	...	...	...	...	...	...	...	...	...	...	...	...
33.	,, militaris, *Erich.*	...	...	...	*	...	...	*	*	*	*	...	...	*	...
34.	Inopeplus dimidiatus, *Wat.*	...	...	...	*	...	...	...	*	*	...	...	...	...	...
35.	,, trepidus, *Pasc.*	...	*	...	...	...	...	...	...	...	...	...	...	...	...
36.	Cryptamorpha Desjardinsii, *Guér*	...	...	...	*	...	*	...	...	*	...	*	*	..	*
37.	,, triguttata, *Wat.*	..	...	...	...	...	...	...	...	...	...	*	...	*	...
38.	,, optata, *Olliff*	...	...	...	...	...	...	...	...	...	...	...	...	*	...
39.	Silvanus brevicornis, *Erich.*	...	...	...	...	...	...	...	...	...	...	...	...	*	...
40.	,, castaneus, *Macleay*	...	...	...	*	...	...	*	*	*	...	...	...	...	...
41.	,, surinamensis, *Linn.*	...	...	...	...	...	...	*	...	*	...	*	...	...	...
42.	,, congener, *Olliff*	...	...	...	...	...	...	...	...	...	...	*	...	...	...
43.	,, atratulus, *Gr.*	*	...	...	...	...	...	...	...	...	...	...	...	...	...
44.	Myrabolia Haroldiana, *Reitt.*	*	...	...	...	...	...	...	...	...	...	...	...	...	...
45.	,, Grouvelliana, *Reitt.*	...	...	...	...	...	...	...	...	...	...	...	...	*	...
46.	Nausibius dentatus, *Marsh*	...	*	...	...	...	...	*	...	*	...	...	...	...	...

I take this opportunity of acknowledging my obligations to the Hon. William Macleay for granting me free access to his rich library and collections.

The letters A.M., after the name of a species, indicate that it is represented in the collection of the Australian Museum.

Family. CUCUJIDÆ.

Sub-family. I. PASSANDRINÆ.

PASSANDRA.

Dalman, Schönherr, Syst. Ins., 1817, App. p. 146.

1. PASSANDRA MARGINATA.

Passandra marginata, Grouvelle, Bull. Soc. Ent. Fr., (5), VII., p. clix, (1877); Ann. Soc. Ent. Fr., (5), VIII., p. 261, pl. 8, fig. 2, (1878).

Australia.

HECTARTHRUM.

Newman, Ent. Mag. V. p. 398 (1838.)

The species belonging to this genus, which are contained in the collection of the British Museum, have been tabulated by Mr. Waterhouse. (Ent. Mo. Mag., XIII., pp. 118-119, 1876.)

2. HECTARTHRUM BREVIFOSSUM. (A.M.)

Hectarthrum brevifossum, Newman, Ann. Nat. Hist., II., p. 392, (1839)

Hectarthrum cylindricum, (var.) Smith, Col. Ins. Brit. Mus., p. 21, (1851.)

Hectarthrum australicum, (var.) Waterhouse, Ent. Mo. Mag., XIII., p. 119, (1876.)

Cape York, Endeavour River, Port Denison, Gayndah, Moreton Bay, Macintyre River, Queensland; Upper Hunter, Sydney, New South Wales; Victoria; West Australia.

After carefully examining a series of more than sixty examples belonging to the genus *Hectarthrum* I have come to the conclusion, notwithstanding their great variation in size and sculpture, that only one species is at present known from Australia. I, therefore, fully endorse Grouvelle's opinion that the three forms described under the above names are varieties of one species.

The specimens before me vary from 7 to 23 mm. in length.

ANCISTRIA.

Erichson, Nat. Ins., III., p. 305, (1845.)

3. ANCISTRIA RETUSA. (A.M.)

Ancistria retusa, Fabricius, Syst. El., II., p. 555.

Prionophora cylindrica, Westwood, Cab. Orient. Ent., p. 85, pl. 41, fig. 6.

Cape York, North Australia; Tasmania.

It is very possible that the specimens from Tasmania will prove to belong to a distinct species, as they differ slightly in punctuation from the form which has hitherto been regarded as the typical *A. retusa*.

PROSTOMIS.

Latreille, Règn. Anim., p. 397, (1825.)

The *Prostomis laticeps*, Macleay, is allied to if not congeneric with *Mimemodes* of Reitter (Deutsche Ent. Zeit, 1876, p. 296), and must be referred to the family Monotomidæ. Mr. Macleay has compared his species with the figure of Reitter's *M. monstrosum* (Wien Ent. Zeit, 1884, pl. IV.), kindly forwarded to me by my friend Mr. George Lewis, and agrees with me in considering them probably members of the same genus.

4. PROSTOMIS ATKINSONI. (A.M.)

Prostomis Atkinsoni, Waterhouse, Ent. Mo. Mag., XIV., p. 26, (1877.)

Tasmania; Alps of Victoria.

I think it probable that too many species have been described belonging to the section of the genus having the sides of the prothorax rounded, of which this species may be considered the type, as the series now before me shows that the punctuation of the head and elytra is liable to some variation. The differences, such as they are, between this and the allied species I have recently pointed out in a short paper published in the "Notes from the Leyden Museum," for April, 1884.

5. Prostomis cornutus. (A.M.)

Prostomis cornutus, Waterhouse, Ent. Mo. Mag., XIV., p. 26 (1877.)

South Australia; Tasmania.

It is interesting to find Tasmanian examples of this species, which is at once distinguished by the jugular processes being at right angles to their base, as showing that its range does not differ greatly from that of the preceding species. The *P. mandibularis*, Fabr., recorded, with doubt, from New Zealand will probably turn out to be a specimen of this or the foregoing species.

Bessaphilus.

Waterhouse, Ent. Mo. Mag., XIV., p. 26, (1877).

6. Bessaphilus cephalotes.

Bessaphilus cephalotes, Waterhouse, Ent. Mo. Mag., XIV., p. 27, (1877).

Tasmania.

Sub-family. II. CUCUJINÆ.

Tribe. I. CUCUJINA.

Cucujus.

Fabricius, Syst. Ent., 1775, p. 204.

7. Cucujus coloniarius, sp. n. (A.M.)

Elongate, much depressed, pitchy black, somewhat shining; head produced into a distinct node behind the eyes; prothorax with the anterior angles only slightly produced; elytra bright red.

Head transverse, narrowed in front, closely and rather strongly punctured, with a deeply impressed line parallel to the posterior margin; the sides produced into a distinct node behind the eyes, which are rather large and prominent; the clypeus truncated in front, with a moderately deep impression on each side at the base; the mandibles rather closely rugose-punctate. Antennæ rather longer than the head and prothorax together. Prothorax transverse, slightly narrowed posteriorly, moderately strongly, closely and irregularly punctured, with a large transverse shallow impression on the disc near the anterior margin; the anterior angles very slightly produced; the sides feebly serrate; the posterior angles rounded. Scutellum pitchy red, rounded behind, not very closely punctured. Elytra about twice as long as the head and prothorax together, distinctly and rather closely punctured; the sides nearly parallel for about three fourths of their length, then rounded to the apex; each elytron with four indistinct and very feebly raised costæ, the lateral margin rather strongly raised. Underside pitchy black; the prosternum transversely rugose in front, moderately strongly and irregularly punctate behind; the mesosternum rather strongly punctured; the metasternum and abdominal segments finely and moderately closely punctured. Legs pitchy black. Length 15 mm.; greatest width 4½ mm.

Illawarra, New South Wales.

The present species is the first true *Cucujus* detected in Australia and seems, in some respects, to be closely allied to the Japanese *C. coccinatus* (1). It is, however, larger, and comparatively broader; its head is proportionately narrower (the lateral projections being less prominent and more distinctly nodiform); its elytra are much more strongly punctured; and its prothorax is broader and has the sides more feebly serrate.

One of the two specimens of this species which have come under my notice was captured under bark in company with the *Ipsaphes bicolor.*

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(1) *Lewis*, Ent. Mo. Mag., XVII., p. 198.

IPSAPHES.

Pascoe, Journal of Entom., II., p. 39, (1863.)

Ipsaphes nitidulus, of Macleay, appears to be allied to the heteromerous genus *Sitophagus*, and need not be dealt with here. The resemblance of this genus to the Cucujidæ is so great, as to have mislead Herr Reitter, who has made a special study of the Clavicorn Coleoptera, into placing it in that family under the name *Schedarosus*.

8. IPSAPHES MŒROSUS. (A.M.)

Ipsaphes mœrosus, Pascoe, Journal of Entom., II., p. 40, pl. 3, fig. 9, (1863.)

Richmond River, Petersham, Lane Cove, Sydney, Chatsworth, Shelley's Flats, Illawarra, Bombala, New South Wales; Tasmania.

9. IPSAPHES BICOLOR, sp. n. (A.M.)

Elongate, much depressed, pitchy black and shining; elytra and abdominal segments rather bright red.

Head strongly transverse, considerably narrowed in front of the eyes, rather strongly and closely punctured; with a deeply impressed line near the base parallel to the posterior margin; the sides somewhat produced behind the eyes; the clypens very slightly emarginate in front; the mandibles closely and finely punctured. Antennæ about as long as the head and prothorax together, very sparingly clothed with short grey pubescence. Prothorax transverse, slightly broader in front than behind, moderately strongly, very closely and irregularly punctured; the anterior margin slightly arcuate, projecting over the head; the sides rounded and provided with short blunt teeth; median line indistinct; with a moderately large irregular impression on each side at the base. Scutellum transverse, somewhat pointed behind, black, rather strongly and closely punctured. Elytra almost twice as long as the head and prothorax together, very finely, closely and irregularly punctured, the suture slightly raised; humeral angles scarcely prominent; the sides nearly parallel for two-thirds of their length, then arcuately rounded to the apex: each elytron with indistinct costæ; the lateral margin rather strongly raised. Underside coloured as above; the prosternum transversely coriaceous in front, closely punctured behind; the meso-and metasternum more finely and closely punctured; abdominal segments dull red, finely punctured. Legs black, finely punctured, Length 12-14 mm.; greadest width, 4-4$\frac{3}{4}$ mm.

Chatsworth, Illawarra, New South Wales; Mountains near Melbourne (Howitt.)

Although this species is closely allied to *Ipsaphes mœrosus*, Pasc., it may readily be distinguished from it by the colour of its elytra, its narrower head and the larger size of the thoracic teeth. The joints of the antennæ appear to be proportionately larger, especially towards the apex, and the scutellum is pointed behind and not rounded as in that species.

I have had a specimen of this insect in my possession for some time, bearing the manuscript name "*bicolor*," in the handwriting of the late Dr. Howitt, of Melbourne.

PLATISUS.

Erichson, Wiegm. Archiv., I, p. 216. (1842.)

10. PLATISUS OBSCURUS. (A.M.)

Platisus obscurus, Erichson, Wiegm. Archiv., I., 216, (1842.)

Upper Hunter, Sydney, Gunning, Illawarra, New South Wales; Tasmania.

All the specimens of *Platisus*, some thirty in number, which I have examined, appear to belong to this species. In some of them the prothorax is decidedly narrower than in others.

11. PLATISUS INTECRICOLLIS.

Platisus integricollis, Reitter, Verh. z-b. Wien, XXVIII., p. 188, (1878.)

Australia.

12. PLATISUS ANGUSTICOLLIS.

Platisus angusticollis, Reitter, Verh. z-b. Wien, XXVIII., p. 189, (1878.)

Platisus obscurus, Lacordaire, Gen. Col., II., p. 403, pl. 21, fig. 1, (1854.)

Australia; Tasmania.

13. LÆMOPHLŒUS AMABILIS. sp. n. (A.M.)

Elongate, depressed, pale testaceous, shining; prothorax short, considerably narrowed behind, with a distinct lateral stria; elytra broader than the prothorax in front, with a rather large black spot at the humeral angles and a conspicuous fascia of the same colour just behind the middle.

Head transverse, slightly emarginate in front, finely and moderately closely punctured, and provided on each side with a feeble oblique impression just before the base of the antennæ and a finely raised line extending from near the origin of this impression to just before the base; clypeus rather large, feebly emarginate in front; mandibles very strong and prominent, sparingly punctured. Antennæ only slightly longer than the head and prothorax together. Prothorax transverse, much broader in front than behind, finely and closely punctured; the anterior angles produced; the sides regularly rounded; the posterior angles slightly reflexed; the lateral line rather strongly impressed in the middle. Scutellum transverse, pointed behind, very sparingly punctured. Elytra about one and a half times as long as the head and prothorax together, slightly narrowed behind, indistinctly and not very closely punctate—striate, the first and fifth striæ more deeply impressed; humeral angles very slightly produced; each elytron with the fascia rather broad and extending from just beyond the sutural stria to the lateral margin. Legs pale testaceous. Length 2—2½ mm.

Wide Bay, Queensland; Lane Cove, Sydney, Port Hacking, New South Wales.

The male of this species has the head somewhat broader and the antennæ slightly longer than the other sex.

The *Læmophloeus* characterized above is very distinct from all the species known to me and may be distinguished by its short antennæ, broad prothorax (with the deeply impressed lateral line) and prettily marked elytra.

14. LÆMOPHLOEUS RAMSAYI. sp. n. (A.M.)

Elongate, depressed, dark metallic brassy green; prothorax considerably narrowed behind, with a distinct lateral stria; scutellum testaceous; elytra metallic green, sparingly covered with long yellow pubescence, with a moderately broad testaceous fascia considerably before the middle and a similar but narrower fascia just before the apex.

Head transverse, narrowed and slightly emarginate in front, very finely and sparingly punctured, with a rather deeply impressed line running parallel to the posterior margin; clypeus rather large, slightly emarginate in front; mandibles very large and prominent, pale reddish testaceous, with the tips pitchy. Antennæ considerably longer than the head and prothorax together, pitchy red, the apex of the terminal joint pale testaceous. Prothorax finely and sparingly punctured; the anterior angles deflexed and rather strongly produced; the sides rounded and feebly sinuate just before the base; the posterior angles very slightly produced. Scutellum transverse, impunctate. Elytra scarcely one and a half times as long as the head and prothorax together, broader than the prothorax in front, gradually widening out until just behind the middle, then rounded to the apex, indistinctly and not very closely punctate-striate, the interstices wide and very sparingly punctured, the sutural stria obsolete near the scutellum, the fourth stria rather deeply impressed, the pubescence emitted from the striæ; each elytron with a moderately broad oblique fascia considerably before the middle, extending from behind the humeral angles to just before the suture, and a similar but much narrower fascia extending from near the suture to the lateral margin near the apex. Legs reddish testaceous. Length $1\frac{3}{4}$—$2\frac{1}{4}$ mm.

Wide Bay, Queensland.

This interesting and very distinct form appears to belong to the same section of the genus as the *L. salpingoides* and *L. productus* of Grouvelle. It differs from the latter, to which it is most nearly allied, in colour, in the position of the markings on the elytra and in having the prothorax slightly narrowed behind. The apical joint of the antennæ in *L. Ramsayi* is as long as three preceding ones together.

I am indebted to Mr. Masters for the opportunity of describing this species.

15. LÆMOPHLOEUS TUBERCULATUS.

Læmophloeus tuberculatus, Grouvelle, Bull. Soc. Ent., Fr., (5) VII., pl. 1., (1877); Ann. Soc. Ent., Fr., (5), VIII., p. 71, pl. 2, fig. 6, (1878).

Australia.

16. LÆMOPHLŒUS TASMANICUS.

Læmophlœus tasmanicus, Grouvelle, Ann. Soc. Ent. Fr. (5), VI., p. 498, pl. 9, fig. 17, (1876.)

Tasmania.

17. LÆMOPHLŒUS ARTICEPS, sp. n. (A. M.)

Elongate, depressed, reddish testaceous, shining; head rather narrow; prothorax slightly narrowed behind, the lateral stria distinct and feebly sinuate in the middle; elytra much broader than the prothorax, with the base and an irregular fascia behind the middle pitchy black.

Head transverse, narrowed and slightly emarginate in front, finely and closely punctured, with an indistinct longitudinal impression in the middle; clypeus rounded in front; mandibles moderately prominent, extremely finely punctured. Antennæ considerably longer than the head and prothorax together, reddish testaceous, the last three joints slightly darker than the others. Prothorax strongly transverse, considerably broader than the head in front, only slightly narrowed posteriorly, finely and closely punctured; anterior angles produced; the sides rounded and very feebly sinuate just before the posterior angles. Scutellum transverse, pointed behind. Elytra about one and a half times as long as the head and prothorax together, finely and rather closely striate-punctate, the first and fourth striæ rather more deeply impressed; humeral angles very slightly produced: each elytron with a pitchy black basal spot which is continued along the suture and an irregular fascia behind the middle extending from the suture (where it is narrowest) to the lateral margin. Legs reddish testaceous. Length 2-2½ mm.

Wide Bay, Queensland; Mundarlo, Tarcutta, Merimbula, Monaro, New South Wales.

Appears to be more nearly allied to *Læmophlœus tasmanicus* than to any other species.

18. LÆMOPHLŒUS CONTAMINATUS. (A.M.)

Læmophlœus contaminatus, Grouvelle, Bull. Soc. Ent. Fr. (5), VII., p. 219, (1877); Ann. Soc. Ent. Fr. (5), VIII., p. 265, pl. 8, fig. 7, (1878.)

Wide Bay, Queensland.

The specimens of this species in the collection of the Australian Museum agree in every respect with Grouvelle's figure except that in the males, the head appears to be slightly broader. In some specimens the head and prothorax are black, and in others reddish castaneous.

19. LÆMOPHLŒUS CONTERMINUS, sp. n. (A.M.)

Elongate, somewhat depressed, reddish testaceous, shining, very finely and moderately closely pubescent; prothorax very slightly broader in front than behind, the lateral stria distinct; elytra with four striæ on each side, the suture dusky.

Head transverse, narrowed and slightly emarginate in front, rather finely and closely punctured; clypeus small, rounded in front; mandibles not very prominent. Antennæ considerably longer than the head and prothorax together. Prothorax much broader than long, very slightly narrowed behind, finely and closely punctured; the anterior angles somewhat produced; the sides arcuately rounded; the posterior angles obtuse. Scutellum transverse, sparingly punctured, pointed behind. Elytra about one and a half times as long as the head and prothorax together, striate, the interstices finely and rather closely punctured and distinctly pubescent; the humeral angles scarcely prominent. Legs pale reddish testaceous. Length 2 mm.

Wide Bay, Queensland; Kiama, New South Wales.

This species approaches very nearly to *L. contaminatus;* it differs, however, in its smaller size, narrower head and prothorax, and in the different form and position of the elytral striæ; in *L. conterminus* there is a distinct sutural stria and the punctures in the interstices are arranged in two tolerably regular series; whereas in the other species the sutural stria is very indistinct and the punctures less regular; the form of the prothorax, which is but very slightly narrowed behind, and the concolorous upper surface will also sufficiently distinguish it.

20. LÆMOPHLŒUS TESTACEUS. (A.M.)

Cucujus testaceus, Fabricius Mant. Ins., I., p. 166, (1787.)

Læmophlœus testaceus, Sturm, Ins., XXI., p. 46, pl. 383, fig. A.

Læmophlœus Zimmermanni, Le Conte, Proc. Ac. Phil., 1854, p. 75.

Upper Hunter, Blackheath, Lane Cove, Sydney, Wagga Wagga, Mundarlo, Tarcutta, New South Wales; Tasmania.

A considerable number of specimens of this almost cosmopolitan insect have come under my notice. It is often found about outhouses and granaries, but abounds more particularly under the bark of newly-felled timber, in which situation I have recently captured it at Blackheath, some 3,500 miles above the sea level.

21. LÆMOPHLŒUS MACLEAYI. (A.M.)

Placonotus longicornis, Macleay, Trans. Ent. Soc., N. S. Wales, II., p. 168 (1871.)

Gayndah, Queensland.

Closely allied to the preceding species, but differs in having the head and prothorax castaneous and the lateral striæ on the latter, decidedly more distinct. It is also somewhat larger and the elytra are, if anything, a trifle broader behind. As the specific name "*longicornis*" is preoccupied in the genus *Læmophlœus* I have followed the general practice in such cases and have proposed to name this species after the author who first published a description of it.

22. LÆMOPHLŒUS BISTRIATUS. (A.M.)

Læmophlœus bistriatus, Grouvelle, Ann. Soc. Ent. Fr. (5), VIII. p. 72, pl. 2, fig. 8, (1878.)

Sutton Forest, New South Wales ; Tasmania.

A single specimen collected by Mr. Masters at Sutton Forest appears to agree with this species.

23. LÆMOPHLŒUS LEACHII.

Læmophlœus leachii, Grouvelle, Ann. Soc. Ent. Fr. (5), VI., p. 499, pl. 9, fig. 18, (1876.)

New South Wales.

24. LÆMOPHLŒUS RIGIDUS. sp. n. (A.M.)

Elongate, depressed, reddish testaceous, shining; prothorax very slightly broader than long, a little broader in front than behind, with a distinct lateral stria which is rather strongly impressed just behind the middle ; elytra somewhat depressed on each side of the suture, almost truncate behind, with an indistinct dusky marking near the scutellum.

Head transverse, slightly narrowed and emarginate in front, feebly impressed in the middle, finely and rather closely punctured; clypeus very feebly emarginate in front; mandibles moderately prominent, very finely punctured. Antennæ considerably longer than the head and prothorax together, the first joint much larger than the other, especially in the male. Prothorax finely and moderately closely punctured; the anterior angles slightly produced. Scutellum rather small, rounded behind, very finely punctured. Elytra nearly one and a half times as long as the head and prothorax together, slightly narrowed both in front and behind, finely and moderately closely punctate-striate, the interstices very finely punctured, with a slight impression at the base on each side of the scutellum; the humeral angles scarcely produced: the sides almost parallel. Legs robust; the femora, especially those of the posterior legs, considerably thickened. Length, 2½-3 mm.

King George's Sound, West Australia.

This *Læmophlœus* somewhat resembles *L. Beccarii*, Grouvelle (Ann. Mus. Genov. XVIII., p. 286, pl. 7, fig. 14) in outline, but differs greatly in structure. The first joint of the antennæ is enlarged, particularly in the male, but not triangular, and the elytra are truncated behind.

25. LÆMOPHLŒUS INSIGNIS.

Læmophlœus insignis, Grouvelle, Ann. Mus. Genov., XVIII., p. 279, pl. 7, fig. 5, (1883.)

Somerset, North Australia.

26. LÆMOPHLŒUS LEPIDUS.

Læmophlœus lepidus, Grouvelle, Ann. Mus. Genov. XVIII., p. 280, pl. 7, fig. 6, (1883.)

Somerset, North Australia.

Also found at Singapore and in Borneo.

27. LÆMOPHLŒUS PARVULUS.

Læmophlœus parvulus, Grouvelle, Ann. Mus. Genov., XVIII., p. 287, pl. 7. fig. 15, (1883.)

"Coke Town, Australia." [Probably a misprint for Cooktown.]

Tribe, II. BRONTINA.

DENDROPHAGUS.

Schönherr, Vet. Akad. Handl., 1809, p. 50.

28. DENDROPHAGUS AUSTRALIS. (A.M.)

Dendrophagus australis, Erichson, Wiegm. Archiv., I., p. 218, (1842).

Wide Bay, Queensland; Upper Hunter, Lane Cove, Sydney, Wagga Wagga, Bombala, Mundarlo, New South Wales; Victoria; Port Lincoln, South Australia; Tasmania; Lord Howe Island.

This is one of the commonest and most widely distributed of the Australian Cucujidæ.

BRONTES.

Fabricius, Syst. El., II., p. 97, (1801).

29. BRONTES MACLEAYI. sp. n. (A.M.)

Elongate, slightly convex, dark ferruginous brown, shining, sparingly clothed with long dark pubescence; prothorax rather longer than broad, with the sides feebly serrate and the anterior angles produced into a strong spine; elytra moderately strongly punctate-striate; antennæ, tibiæ, and tarsi pale furruginous.

Head transverse, rather finely and very sparingly punctured towards the sides, the space between the antennal nodes almost impunctate; clypeus rather large, sparingly punctured. Antennæ reaching considerably beyond the apex of the elytra, the first joint about as long as the head and prothorax together, the second joint somewhat less than half as long as the first. Prothorax slightly narrower in front than behind, strongly, irregularly and closely punctured, with a slight elevation on each side of the middle; the anterior angles produced into a strong and rather sharp upturned spine; the sides feebly serrate and moderately strongly rounded. Scutellum transverse, closely and rather strongly punctured. Elytra about twice as long as the head and prothorax together, much broader than the prothorax at the base, arcuately narrowed behind, moderately strongly and rather closely punctate-striate, the interstices narrow and very slightly raised; the humeral angles very slightly produced; the sides feebly reflexed. Legs with the femora dark ferruginous brown, the tibiæ and tarsi much paler. Length 13-14 mm.; greatest width $4\frac{3}{4}$ mm.

Port Darwin, North Australia; Richmond River, New South Wales.

This fine species, which is the largest *Brontes* known to me, can be separated at once from all the Australian species by the form of its head and prothorax and by its having the elytra somewhat convex. The Richmond River specimen in the Macleay Museum is rather darker in colour than the other individual.

30. BRONTES LUCIUS. (A.M.)

Brontes lucius, Pascoe, Journal of Entom., I., p. 321, (1862).

Brontes nigricans, Pascoe, *loc. cit.*

Wide Bay, Gayndah, Queensland; Clarence River, Port Macquarie, Sydney, Illawarra, New South Wales; Victoria; Tasmania.

After a careful comparison of a long series with specimens which I named from Mr. Pascoe's types, I have little hesitation in stating my conviction that the two forms bearing the above names are merely extreme varieties of one species. In the series now before me the spines on the prothorax vary considerably in size and shape, the punctuation of the elytra is less regular in some of the larger specimens and the colour of the individuals from Clarence River is much darker than that of the others.

31. BRONTES AUSTRALIS. (A.M.)

Brontes australis, Erichson, Wiegm. Archiv., I., p. 217, (1842.)

Tasmania.

32. BRONTES DENTICULATUS.

Brontes denticulatus, Smith, Col. Ins. Brit. Mus., I., p. 14, (1851.)

Australia.

33. BRONTES MILITARIS. (A.M.)

Brontes militaris, Erichson, Wiegm. Archiv., I., p. 217, (1842.)

Ipswich, Queensland; Sydney, Illawarra, New South Wales; Victoria; Tasmania.

Sub-Family. III. HEMIPEPLINÆ.

INOPEPLUS.

Smith, Col. Ins. Brit. Mus., I., p. 4, (1851.)

34. INOPEPLUS DIMIDIATUS. (A.M.)

Ino dimidiatus, Waterhouse, Trans. Ent. Soc. Lond., 1875, p. 191.

Port Bowen, Wide Bay, Brisbane, Queensland; Blackheath, Illawarra, New South Wales.

During April of the present year I found a single specimen o this pretty species under the bark of a species of *Banksia* a Blackheath. This insect varies slightly in the extent of the black marking on the apex of its elytra.

35. INOPEPLUS TREPIDUS. (A.M.)

Ino trepida, Pascoe, Journal of Entom., I., p. 322, (1862.)

Cape York.

A single example agreeing in every particular with the descrip tion of this species which has been recorded from Singapore Sumatra, Gilolo, Dorey, and New Guinea.

Sub-Family. IV. TELEPHANINÆ.

CRYPTAMORPHA.

Wollaston, Ins. Mader., p. 156, (1854.)

36. CRYPTAMORPHA DESJARDINSII. (A.M.)

Psammœcus Desjardinsii, Guérin, Règn. Anim., V., p. 196, (1829.

Dendrophagus suturalis, White, Voy. Erebus and Terror. Ent p. 18, (1846.)

Cryptamorpha musæ, Wollaston, Ins. Mader, p. 157, pl. 4, fig. 1, (1854.)

Pseudophanus signatus, Leconte, Proc. Ac. Phil., 1859, p. 85.

Gayndah, Queensland; Upper Hunter, New South Wales; South Australia; West Australia; Lord Howe Island.

Appears to be imported in articles of commerce, having been recorded from North America, Madeira, Mauritius and New Zealand.

37. CRYPTAMORPHA TRIGUTTATA. (A.M.)

Cryptamorpha triguttata, Waterhouse, Ent. Mo. Mag., XIII., p. 123, (1876.)

South Australia; Tasmania.

One of the Tasmanian examples, of the typical size and form, differs in having the prothorax tinged with bronzy green.

38. CRYPTAMORPHA OPTATA, sp. n. (A.M.)

Elongate, somewhat depressed, reddish testaceous, shining, finely and closely pubescent; prothorax rather long, fuscous towards the sides; elytra rather strongly punctate-striate, with a broad and very indistinct fascia just behind the middle; legs pale testaceous.

Head narrowed in front, finely coriaceous, with a strongly impressed line on each side extending from the origin of the antennæ to the base, and a smaller oblique furrow running towards the eye. Antennæ reddish testaceous. Prothorax considerably longer than broad, slightly narrowed behind, strongly and closely punctured; the anterior angles rounded; the sides moderately strongly sinuate just before the base, provided with six or seven long bristly hairs; the posterior angles slightly produced. Scutellum transverse, rounded behind, indistinctly punctured. Elytra about two and a half times as long as the prothorax, rather strongly and closely punctate-striate, the interstices narrow and very slightly raised; the sides nearly parallel for two-thirds of their length then rounded to the apex. Length, 3¼ mm.

Tasmania.

This insect is sufficiently distinguished from *C. triguttata,* to which it is closely allied, by its paler colour, slightly broader and less parallel sided prothorax, and by the absence of black spots on its elytra. The antennæ and legs are entirely testaceous.

Sub-family. V. SILVANINÆ.

SILVANUS.

Latreille, Gen. Crust. et Ins. III., p. 19, (1807.)

39. SILVANUS BREVICORNIS.

Silvanus brevicornis, Erichson, Wiegm. Archiv., I., p. 218, (1842.)

Tasmania.

40. SILVANUS CASTANEUS. (A.M.)

Silvanus castaneus, Macleay, Trans. Ent. Soc., N. S. Wales, II., p. 168, (1871.)

Gayndah, Queensland; Lane Cove, Sydney, Wagga Wagga, Gundagai, Mundarlo, Currajong, New South Wales.

Allied to the European *Silvanus unidentatus,* Oliv., from which it differs in having the prothorax much longer and more sinuous at the sides and in its darker and less shining upper surface; the anterior angles are also more prominent and the punctuation of the head and prothorax somewhat less strong and close.

The *S. inæqualis,* Grouv. (Ann. Mus. Genov., XVIII., p. 293, pl. 7, fig. 25), appears to be closely allied to, if not identical, with this species.

41. SILVANUS SURINAMENSIS. (A.M.)

Dermestes surinamensis, Linnæus, Syst. Nat., I., pt. 2, p. 565, (1767.)

Silvanus surinamensis, Stephens, Ill. Brit. Ent., III., p. 104, (1830.)

Blackheath, Sydney, New South Wales; South Australia.

A single example of this *Silvanus,* which is found in warehouses and granaries all over the world, was captured by myself under bark in the neighbourhood of Blackheath during April last. It has already been recorded by Redtenbacher from Sydney.

42. SILVANUS CONGENER, sp. n. (A.M.)

Elongate, narrow and parallel, dark reddish brown, rather closely pubescent; prothorax much longer than broad, with an indistinct longitudinal impression on each side of the middle, the sides armed with six moderately prominent teeth; elytra finely striate-punctate.

Head with the sides nearly straight, deeply and closely punctured at the base, somewhat less closely punctured in front. Prothorax elongated, slightly narrowed behind, rather strongly and closely punctured, the disc somewhat flattened, with an indistinct longitudinal impression on each side of the middle extending from just behind the anterior margin to near the base; the sides nearly parallel and armed with six rather prominent teeth situated at nearly equal distances from each other. Elytra rather long, generally a little paler than the head and prothorax, finely striate-punctate, the alternate interstices being almost imperceptibly raised; the sides arcuately narrowed behind. Legs reddish ferruginous. Length 3-3½ mm.

South Australia.

The somewhat larger size and narrower form of this species, in conjunction with the more parallel sides, and less rounded angles, of its prothorax, will serve to separate it from *S. surinamensis*. The grooves on the prothorax in *S. congener* are indistinct and comparatively broad.

43. SILVANUS ATRATULUS.

Silvanus atratulus, Grouvelle, Bull. Soc., Ent. Fr., (5), VII., p. clix, (1877); Ann. Soc. Ent. Fr., (5), VIII., p. 266, pl. 8, fig. 9, (1878).

Australia.

MYRABOLIA.

Reitter, Col. Hefte., XV., p. 55, (1876)

44. MYRABOLIA HAROLDIANA.

Myrabolia Haroldiana, Reitter, Col. Hefte., XV., p. 56, (1876).

Australia.

45. MYRABOLIA GROUVELLIANA.

Myrabolia Grouvelliana, Reitter, Verh. z-b., Wien XXVII., p. 179, (1877).

Tasmania.

NAUSIBIUS.

Redtenbacher, Faun. Austr., II., p. 998, (1858).

46. NAUSIBIUS DENTATUS. (A.M.)

Silvanus dentatus, Marsham, Ent. Brit., p. 108.

Nausibius dentatus, Jacq. Duv., Gen. Col., II., pl. 50, fig. 250.

Cape York, North Australia ; Sydney.

Found all over the world imported with articles of commerce and more especially in sugar.

DESCRIPTIONS OF NEW FISHES FROM PORT JACKSON.

By J. Douglas-Ogilby,

Assistant Zoologist, Australian Museum.

Petraïtes heptæolus, sp. nov.

B. VI. D. 3/27/1-2. A. 2/18-2. V. 1/3. P. 12.

Length of the head $5\frac{1}{10}$, of caudal fin $6\frac{2}{5}$, height of body $4\frac{3}{5}$ in the total length. Diameter of eye $3\frac{5}{6}$ in the length of head. Snout short, $\frac{1}{2}$ of a diameter of eye. Interorbital space slightly convex, $\frac{2}{3}$ of the same. Upper facial profile convex. Maxillary reaches to behind the middle of the orbit. A single small simple tentacle above each eye, and another, which is fringed, and widened out at the tip, on the anterior nostrils. Small teeth on both jaws, and on the vomer; the lower jaw with one or two small canines at the outer angles. The first dorsal is joined by a membrane to the second. it is $\frac{1}{2}$ of the height of the body, and equal to the last spine of the second, in which there are but three rays, the anterior pair of which are separated by a broad membranous interspace, while the third is similarly joined to the root of the caudal. There is a corresponding interspace before the two last anal rays, but no membrane connecting the last ray with the tail; both these fins are highest posteriorly. The pectoral and ventral fins are equal in length, and $\frac{5}{7}$ of that of the head. Caudal short, rounded. Scales exceedingly small.

Colours bright olive-green above, shading into the grey of the under parts. There are seven black spots on each side along the base of the dorsal fin, upon which they encroach a little when the fish is newly caught; the first spot is below the short dorsal; along the middle of the sides is a less conspicuous row of seven spots, the first of which corresponds to the second of the upper row. There are also faint signs of an anal row. Opercles and under side of the head suffused with pink. Anal with several narrow dark vertical stripes, the intervening spaces speckled. Ventrals, pectorals, and caudal spotted with brown, and tipped with orange; the latter with a black spot at the upper terminal angle.

The above description is taken from a specimen, caught in Port Jackson on the 11th of last April, and measuring $3\frac{3}{10}$ inches.

Mr. Macleay (Cat. Aust. Fishes, Vol. II., p. 22), suggests the advisability of forming a new genus for the reception of his *Cristiceps fasciatus*, and certain other forms now placed indiscriminately in *Clinus* or *Cristiceps* as the author's fancy may dictate. With this suggestion I cordially agree, and propose therefore to form the genus *Peträites* for the reception of those homeless fishes, which oscillate between the two genera mentioned.

The genus would be thus characterized.

PETRÄITES. gen. nov.

Branchiostegals six; body compressed, covered with small scales: Snout very short, cleft of the mouth small. A band of moderate teeth on the jaws; lower jaw with a strong curved canine at either angle; vomerine teeth present: palate edentulous. First dorsal fin low, attached by a membrane to the second. Dorsal slightly contiguous with the caudal.

Type specimen in Australian Museum; registered number B. 6699.

PLATYCEPHALUS MACRODON. sp. nov.

B. VII. D. 1/7/14. A. 14. V. 1/5. P. 8/14. L. lat. 73. L. trans. 10/20

Length of head $3\frac{1}{3}$, of caudal fin $7\frac{1}{4}$, height of body $8\frac{9}{10}$ in the total length. Diameter of eye $5\frac{1}{3}$ in the length of head, $1\frac{1}{4}$ in that of snout, which is narrow and but moderately depressed. Interorbital space slightly concave, $\frac{2}{3}$ of the diameter of eye. Width of the head immediately in front of the eyes $2\frac{6}{7}$, inside the preopercular spines $1\frac{5}{6}$ in its length. Maxillary extends to below the middle of the orbit. Supraorbital with a single minute anterior spine. Snout with numerous smooth ridges, which are very faint on the interorbital space. A low, irregular, sometimes double, ridge runs from a little behind the middle of the upper margin of the orbit to the hinder edge of the cranium, and bears a few small spines. A similar ridge along the upper edge of the opercles terminates at the origin of the lateral line, and is also spiniferous. Two moderately sized spines, of which the upper is the more projecting, point forwards from the lower anterior angle of each preorbital, behind which rise two prominent smooth parallel ridges which terminate at the preopercular angle in strong flattened spines, the lower of which is much the longer. Two compressed opercular spines, almost hidden beneath the cuticle. A short blunt spine on the suboperculum, which bears no flaps. Anterior nostril with a short broad fringed tentacle. Lower jaw the longer. Maxilla with a broad band of villiform teeth, and a longitudinal row of three strong incurved canines, on either side of the symphysis, the anterior being much the smallest. The mandibular and palatine bands are much narrower, and are interspersed with strong canines, pointing inwards, and placed at regular intervals. A crescentic band of conical teeth on the head of the vomer, the strongest on the outside. First dorsal spine short and isolated; the second the longest, $2\frac{1}{5}$ in the length of head; soft dorsal highest anteriorly, nowhere so high as the spinous. Pectoral short, $\frac{1}{2}$ the length of head, eight lower rays simple. Three inner rays of ventrals rather elongate, $\frac{2}{3}$ of the length of head, and reaching to second anal ray. Anal commences beneath the third dorsal ray. Caudal short, truncated. Lateral line smooth.

Colours bright golden brown, except on the flat lower surface, which, with the anal fin, is colorless. There are numerous small bluish spots above the lateral line. Dorsals hyaline, the spines and rays spotted with golden brown. Pectorals and ventrals similarly spotted on a lead-coloured ground. Caudal with large basal golden spots, and a broad dusky marginal band.

The example from which I have taken the above description is a female, and has the ova about half developed. It measures a little over 13 inches, and was trawled in Port Jackson on the 25th April. The stomach contained an *Atherina pinguis*, 4 inches long, among other irrecognisable matter.

Type specimen in Australian Museum; registered number B. 6,541.

PERCIS NOVÆ-CAMBRIÆ. sp. nov.

B. VI. D. 4/24-25. A. 20. V. 1/5 P. 17. L. lat. 65. L. trans. 3½/13.

Length of head 4½, of caudal fin 6⅖, height of body 7¾ in the total length. Diameter of eye about ¼ of the length of the head, equal to the length of the snout, and more than double the interorbital space, which is flat. The greatest width of the head is equal to its length behind the anterior margin of the orbit; the greatest height to half its length. Snout rather blunt; cleft of mouth slightly oblique; lower jaw a little the longer; maxillary reaches to beyond the vertical from the middle of the eye. The preoperculum is furnished with some coarse serrations on the hinder limb, and especially at the angle; these however, seem to disappear with age. A single blunt opercular spine. The jaws are armed with a broad band of villiform teeth, the outer row of which is somewhat the larger; also with 4 or 5 strong curved canines on each side of the symphyses, and a similar row at the posterior end of each jaw, those in the lower being the strongest; there is also a lunate patch of villiform teeth on the vomer. Fourth dorsal spine the longest, ⅚ of the diameter of eye; the third but little shorter. The pectoral is equal to ⅘ of the length of the head; the ventral which is not quite so long does not reach the vent. Caudal rounded.

Colors, (in spirits) above yellowish-brown, with very indistinct darker marblings; head darker than body; sides and belly yellowish. Seven large dark brown spots below the lateral line, and approximating to the ventral profile. A narrow brown band from above the root of the pectoral to the upper part of the caudal fin, where it disappears in a round nearly black spot, which is continued downwards, of a lighter shade, across the base of the rays, and along the lower margin of the fin in a darker band, and finally passes up the terminal margin in a narrow band; remainder of caudal and pectorals yellowish. First dorsal with a black blotch covering the greater part of the fin; second with narrow oblique alternate light and dark bars; anal tipped with blackish, and with vermiculations of the same color on the hyaline basal half. Ventrals dusky.

The above description is taken from two Port Jackson examples, which have long been in the Australian Museum collection, labelled as *Percis nebulosa*, but which differ essentially from that species. They are now in our type collection; registered numbers B. 6,696-97.

I am also constrained to describe as new a species of *Latris*, which was sent up from the markets a few days since, and which differs in several material points from any of those catalogued by Mr. Macleay. I may mention here that in Castelnau's descriptions of the three forms differentiated by him, he omits all mention of two points which are of great importance in this genus, namely, the number of simple pectoral rays and the presence or absence of vomerine teeth. The following is a description of the specimen, which measures $21\frac{1}{3}$ inches and is in the Museum collection, its registered numbeı being B. 7024.

LATRIS RAMSAYI. sp. nov.

B. VI. D. 18/38. A. 3/33. V. 1/5. P. 10/8. L. lat. 103. L. trans. about 10/24.

Length of head $4\frac{3}{8}$, of caudal fin $4\frac{4}{5}$, height of body $3\frac{7}{10}$ in the total length. Diameter of eye $\frac{2}{9}$ of length of head, $\frac{4}{7}$ of snout, and $\frac{6}{7}$ of interorbital space, which is convex. Upper part of snout much swollen. Maxilla reaches to the vertical from the posterior nostril. Preoperculum without cilia. A broad simple skinny flap behind the anterior nostril. Lips fleshy. Lower jaw with a single row of short conical teeth, many of which are wanting in our specimen. Upper jaw with an outer band of strong subulate teeth, and indications of smaller teeth just piercing the skin behind; no vomerine or palatine teeth. The fourth to seventh dorsal spines are about equal and longest, $\frac{1}{3}$ of the length of the head; the first spine is quite separate from the second, and equal to the 17th, which is much shorter than the last; the anterior rays the longest, longer than any of the spines. Anal spines very short, the 3rd much the longest, only $\frac{2}{5}$ of the length of the anterior rays. Pectoral fins $\frac{5}{7}$ of the length of head, its eight lower rays are simple, and shorter than the branched rays. Ventrals short, originating beneath the 9th dorsal spine, not nearly reaching to the vent, and $\frac{5}{9}$ of the length of head. Caudal deeply forked, lobes equal. Scales small, covering the entire head except the mandibulary and anteorbital regions, and the snout in front of the nostrils; the bases of the dorsal, anal, and pectoral fins, and the greater part of the caudal are scaly.

Colours. The upper parts are brown, and shade down into ashy-grey on the sides, both being marked with numerous narrow longitudinal rather indistinct dull yellow bands. A broad light coloured band across the occiput. Lips yellowish-white; inside of mouth blotched with black and white. Vertical fins brown with indistinct lighter blotches. Caudal margined with black, and with a lighter sub-terminal stripe.

It may be as well to call attention here to the following differences between this fish and the genus *Latris*, as constituted by Dr. Gunther. (Cat., Vol. II., p. 86; and Study of Fishes, p. 412.) The left hand column pertains to Gunther's *Latris*, the right hand to the present fish.

Spinous dorsal with 17 spines.	Spinous dorsal with 18 spines.
Teeth villiform in both jaws.	No villiform teeth.
Preoperculum minutely ciliated.	Preoperculum entire.

NOTE ON *NEOANTHIAS GUENTHERI.* Casteln.

By J. Douglas-Ogilby,

Assistant Zoologist, Australian Museum.

On the 13th of last month we received at the Museum a fine specimen of this fish, which had been caught at the Heads during the previous night; it measured 12¼ inches, and proved to be a male with the milt well-developed, and being perfectly fresh when it came into my hands, I had the best possible opportunity of describing it and of noting down its beautiful coloration.

A slightly larger example of Günther's *Anthias longimanus* was also captured at the same time and place, and was sent up to the Museum along with the *Neoanthias;* the similarity of physiognomy between the two fishes is so striking that I made a careful description of this specimen also, more especially when I found that it was a female with well developed ova.

The result of my examination is that I fail to find any appreciable structural difference between the two forms, and as difference in color alone cannot be relied on as specific in this vertebrate class, I am of opinion that the fishes described by Günther, and Castelnau respectively are identical in species, but different in sex.

Dr. Günther (Cat., Vol. I., p. 88), hints at the advisability of separating his *A. longimanus*, and certain other forms, from the typical Anthiads, and in this suggestion I am disposed to agree, nor have we far to look for a generic title suitable to these forms. If we turn to the Fauna Japonica, p. 64, pl. 30, we will find a fish described and figured by Schlegel under the generic name of *Caprodon*, which is easily recognisable as identical with Castelnau's *Neoanthias;* and since we know from the letter-press that Schlegel's description was taken from a mounted specimen which, as remarked by Günther—p. 94—is evidently imperfect, having but five branchiostegals and no palatine teeth, it is probable also that the caudal fin, the shape of which in his figure is unique in connection with the genus *Anthias*, was frayed or even partially broken off, and that the artist replaced it in his own fashion. As Schlegel neglected to give a specific name to his fish, Günther gave it a place in the Catalogue under the title of *Anthias Schlegelii;* and I therefore think that without doubt the true name and synonymy of our fish should stand thus:—

CAPRODON SCHLEGELI.

Caprodon, *Temm. & Schleg., Faun. Jap., Poiss.*, p. 64, pl. 30, 1850, ♂.

Caprodon, *Richards, Ichth., China*, p. 235.

Anthias schlegelii, *Gunth., Cat., Vol. I.*, p. 93, 1859, ♂.

Anthias longimanus, *Gunth., Cat., Vol. I.*, p. 94, 1859, ♀.

Neoanthias guentheri, *Casteln., Proc. Lin. Soc., N. S. W., Vol. III.*, p. 367, 1878, ♂.

Gunther remarks the likeness between his *A. schlegelii* and Richardson's *Serranus rasor*, but the want of lingual teeth in the latter, and also in the *Anthias richardsoni*, forms a marked difference between the two species. Through the kindness of Mr. Macleay I have been enabled of late to examine a specimen of *A. richardsoni*, obtained in this neighbourhood on April 28th, and measuring a little under nine inches, and the first too recorded from our shores. I have also examined some spirit specimens in our own Museum from Tasmania, and am convinced that *rasor* will prove to bear the same relationship to *richardsoni* as *guentheri* does to *longimanus;* in which case the correct name would be *Caprodon rasor.*

NOTES ON THE GEOLOGY AND WATER SUPPLY OF THE INTERIOR OF NEW SOUTH WALES.

PLATE XXV.

BY REV. J. MILNE CURRAN, F.G.S.

The subject of water supply for the interior is occupying a considerable amount of attention at present. Much of what has been suggested on the subject is of no practical value from the fact that comparisons are instituted with other countries where the existing physical conditions are very different. The anomalies, (so called) which we find so often in Australian Geology and Botany present themselves in full force when we come to deal with the question of a water supply for the interior. In other countries the rivers grow and increase as they flow, while in the interior of the colony they (with two exceptions) grow less. When we study a map of the Thames or Ganges we may mark the source of the river and say that a spring or glacial stream comes to light at that place. This is all changed in the country to which these notes refer. When you stand at the point indicated on the map as the source of any western river, you for the most part find no water-course, no water, and can form no idea of where the water comes from. When you do find a "river" you soon learn that neither does it drain the country it flows through, nor is there any soakage from the river. The physical conditions of the interior are so exceptional that one must be familiar with them before any scheme can be proposed to meet all facts observed. The following notes refer to underground waters only, and are made out altogether from personal observation.

Underground Waters.—I take it as proved that the rainfall is largely in excess of water accounted for by soakage, evaporation or the outflow of rivers; otherwise, or as Mr. Russell puts it, we should expect to find at Bourke a river 200 yards wide, and 200 feet deep. The water gets away underground, and the geological history of part, at least, of the interior will explain in what way. By the interior I mean all the country situated west of Dubbo and north of the 33rd parallel. In this country *three* well-marked and distinct geological areas may be distinguished which for convenience I name as follows:—

I. The Great Tertiary Plains or Merri Merri Country.
II. Siluro-Devonian, or Cobar Giralambone Country.
III. Cretaceous or Warrego Country.

The Plains.—The tertiary plains extend from the Bogan to the northern boundary of the colony and are represented to a smaller extent towards the south-west. They are one great alluvial deposit which show the vast amount of material removed by denuding influences from the western slopes north of the 33rd parallel.

The efficacy of denudation for a work of such magnitude may be doubted; but as we find the plains at every known depth composed of materials similar in character to deposits now in course of formation, it would be rash to say what might not have been accomplished by erosion in a country which has been above the sea since mesozoic times at the very least. Writing of Le Puy, Dr. Geikie says that his first impression was one of utter bewilderment, and upset all previous estimates of the power of rain and rivers. There is almost no amount of waste and erosion that may not be brought about in time by the influence of frost, springs, rain and rivers. To understand this in our colony, one has only to travel over some of the hundreds of miles of plains in the interior.

If we imagine the present surface of the interior covered with a deposit of impervious clay, to the depth of 200 feet, the plains would begin about Wellington instead of Dubbo, so far would they encroach on the high lands. The present or Bell River would of course flow on to the plains about the same place and cut a bed for itself on the new surface. Now if a well were sunk through this 200 feet of clay a good supply of water would be found in the old river bed, and further, if this well happened to be sunk on that part of the old river which we know as the "Cataract of the Macquarie" the water would rise to the surface we imagine to exist 200 feet above. Diagram II., will make this clear. There is a bar of rock on the river at this point which would effectually stay the flow, while the impervious clay above would retain the water in that direction. The supply must be practically inexhaustible, for at the place where the river comes on to the new surface, there is the old river bed dipping away, and as capable of absorbing water as if the new deposit never covered it.

Something like what I have been supposing has actually taken place in the past, with this difference that instead of one old river bed under the plains, at one particular level, we have many and on different horizons, from the fact that the formation of the plains extended over great periods of time.

The permanance of drainage-lines is one of the most remarkable facts in the geological history of continents, and Australia is in no way exceptional in this regard. The erosive action of the western rivers and the forming of the plains may have been at work long before Miocene times, when the whole southern portion of the continent was upraised some 600 feet. At that time—in the hey-day of its youth—the average fall of the Macquarie was much greater than at present, and may be represented by *a—b* (Diagram I.) As the plains were formed the river occupied levels as *c*, *d*, *e*, while at the *a* level would be unaltered or eroded if anything. An important point to note is that the newer beds all branch from the old ones, as in the case supposed above, and with like results, namely that while some water will flow along the new channel, a great deal will still get away by the old bed.

It may be objected that if the plains were formed in the way I explain, we should have not many old river beds at different levels, but one great bed of river drift that has been slowly raised while the plains were formed. We might, I admit, expect something like this, if the rivers deposited alluvium to an equal depth, and at the same time over the whole surface of the growing and gradually spreading plains. Then the river would not leave its channel, as when the latter was raised, the banks and surrounding country would be raised to an equal extent. It is almost needless to remark that this is not at all in keeping with our knowledge of the way rivers work in forming plains and depositing alluvium. The great bulk of the transported matter is deposited on or near the banks, so that in time the river margins and eventually the river, will be above the level of the surrounding country. The effect of this, in the end, is to alter the course of the river, only to begin again the same cycle of change. Thus, during the formation of the plains, we have old river beds, (connected with present ones) not only at different levels or on *different horizons*, but also over *separate areas.*

If my explanation be the right one, a glance at Diagram II., will show what becomes of the floods that "never come down the river," and will show, too, how all the wells on the plains are down to the river drift, otherwise there is no water. On the plains north of Nyngan I have seen the water, after rain, flow *from* the banks of the creeks towards a depression, a few hundred yards away, and disappear at such a rate as would make the creek "run," yet the latter was perfectly dry. A vast amount of the rainfall is absorbed in this way that would otherwise reach the *surface* creeks, and so eventually help to swell the river that would then be flowing by Bourke. At Mullungudgeree and other places the water rises in the wells on the old river drift. After the reference to the "Macquarie Cataract," further explanation of this is unnecessary.

I may observe that I have examined a great number of wells of quite another class from any referred to in this paper. They give good water for a time only, and have been called "surface wells." They are sunk in pans or beds of sand that occupy depressions in the clay. The water is merely surface water absorbed by the sand.

Giralambone Country.—The Cobar Giralambone country consists of inclined silurian slates and schists, with patches of devonian lime and sand-stones. The whole area (100 to 150 (?) miles square) is considerably elevated above the plains. Bare and jagged peaks stand out over the general level. Nowhere, as far as I have seen, is the bed-rock at any great distance from the surface. The conditions under which we should expect to find under-ground waters here and on the plains, evidently differ as widely as the geology of the two districts.

Warrego Country.—Of the Cretaceous or Warrego country I cannot at present speak from experience. But it is clear to every geologist, from what is known of Cretaceous rocks, that as regards underground waters we are justified in separating the areas where these rocks occur, from both the Great Tertiary Plains and the Cobar Giralambone country.

SOME REMARKS ON THE FERTILIZATION OF THE GENUS *GOODENIA*.

BY E. HAVILAND.

On perusing the Paper by Mr. Hamilton on the genus *Goodenia* read at our last Meeting, I was much surprised to find, that while admitting the correctness of my own conclusion, that *Goodenia ovata* was cross-fertilized by the aid of insects, he claims that *G. hederacea* is self-fertilised. I mentioned in my former paper on this genus (in Society's Proceedings, June 1884) that, "there could be little doubt, that the whole genus was fertilized by the aid of insects." Indeed it is difficult to imagine that plants of the same genus can differ in so important a feature as their mode of fertilization; unless it be in some partly or wholly cleistogamous plants, as in *Myrsine variabilis*; where not only in the same genus, but in the same species, one tree may be found with the whole of its flowers quite closed until self-fertilization has been effected; and yet another with a portion, only, of its flowers closed, while the remainder open in the usual way and expose themselves to cross-fertilisation; but the relative position of the organs of fertilisation is similar in both cases, and the opening or not opening in this genus I consider to be due to some mechanical condition, which, whether belonging to the individual plant, or accidental, requires investigation. Be this as it may, however; to all intents and purposes, the closed flowers, doomed to self-fertilisation, are cleistogamous, while the others are not.

Mr. Hamilton, in referring to my statement, that in *Goodenia ovata*, a mere touch will open the division of the upper lobe of the corolla, and thus admit the approach of an insect to the stigma; states his inability to open the *back* lobe of the corolla of *G. hederacea*, even with his fingers, camel hair pencil or other blunt article; unless a considerable amount of force is used. In my paper, I speak of the *upper* lobe, and I point out, that, while the lower lobe is not divided so deeply, the upper one is divided nearly to its base. This of course makes the claws of the lobe very narrow and weak, so that the edges of the two divisions which only touch each other, are, as I said, liable to be separated by the slightest movement. Generally however, this opening of the divisions of the lobe is not necessary, the indusium and stigma being in most cases already within the corolla. I only say in my paper "*sometimes* it happens, that although the mouth of the indusium is presented to the opening of the corolla lobe, it may not have quite entered it, and that, in such case, the ready opening of the divisions of the upper lobe remedies the evil, and exposes the stigma to the visits of insects from the inside of the corolla"; but this (happening so exceptionally) is a matter of little importance. A more material point is that which Mr. Hamilton mentions as a "significant fact" that neither full anthers or empty indusia are ever found in open flowers. On reference to my paper, above referred to, it will be found that I say "Taking now a mature and *fully expanded flower*, weshall find the stamens still outside, and usually bent farther away from the corolla, the anthers all open and, and the *pollen either in abundance*, or, in some cases, past that stage, all gone, and the anthers shrivelled." Of course I intended by this to imply that the pollen was generally exposed in the open anthers, but that in some cases insects had carried it away and left the anthers empty. As to the non existence of empty indusia in open flowers. I find in my rough notes, made while studying the genus, a remark touching an open flower of *G. ovata* thus "Notwithstanding that the anthers are empty, there is not a particle of pollen either on or inside the indusium or on the stigma; showing that the flower has not been fertilised by its own pollen (for the stigma was not mature) and moreover that it has not yet received pollen from any other flower." I found many flowers in this state, but I did not deem it necessary to make a note of more than one.

Perhaps the best authority on the fertilization of plants was the late Herman Mueller, and I am bound to admit that in his work on the fertilization of flowers he agrees with Mr. Hamilton, in supposing that the anthers in this genus deposit their pollen, in the first place, into the indusium while in the bud; but from that point he entirely differs from him. His (Herman Mueller's) opinion is pretty clearly expressed thus:—"In the plants of this order the style ends in a collecting cup which receives the pollen while still in the bud, and then closes up, leaving a narrow opening for the most part covered with hairs. At the same time it bends down to stand in the mouth of the almost horizontal flower, so that insect visitors come in contact with the hairs and dust themselves with the pollen. As the stigmatic lobes grow up in the cup (indusium) they keeping forcing fresh pollen into the narrow slit, and finally emerge by it themselves and *then receive the pollen of younger flowers* from *insect visitors.*" My own expressed opinion, that the genus is cross-fertilised by the aid of insects, is thus corroborated by Herman Mueller, who only differs from me in supposing that the pollen is first deposited by the anthers in the indusium of the same flower, and then carried away by insects as the stigma pushes it out of the indusium. Whereas a very careful study of the genus leads me to the conclusion that insects carry away the pollen directly from the anthers, leaving in the same way the stigma when it shall have matured to receive the pollen of other flowers. Even the fact of Mr. Hamilton having found the pollen of the flower closely packed about its own stigma does not necessarily imply self-fertilisation. I have already pointed this out at length in my paper on *Utricularia.* (Pro. Lin. Soc., 29th November, 1882.) It is not by any means unusual for the stigma of a flower to be thickly covered by the pollen from its own anthers; not however for its own fertilisation, but to hold it up and expose it to the visits of insects who carry it away, leaving the stigma clean to receive other pollen in its turn. In the genus *Lobelia,* the style pushes the pollen before it out of the tube formed by the anthers, and in which it is very closely packed. This is carried away by insects; and only then do the stigmatic lobes open to receive what pollen may be brought to them. (See my paper Pro. Lin. Soc., March, 1883.) So also in the genus *Wahlenbergia,* I quote from my paper on that genus in Pro. Lin.

Soc., Dec., 1884. "When the stigma has grown far above the anthers it exposes a large mass of pollen adherent to it, it does not fall into the corolla, but is carried away (presumably) by insects for the fertilization of other flowers. Thus like *Lobelia*, in the same natural order of plants, it first offers its own pollen for the fertilization of other plants, and then exposed its own stigma to receive that of other plants in return."

But we may go still farther, and say, that even the fact of pollen tubes being emitted from the pollen grains, does not of necessity imply self-fertilization. Any one in the habit of examining the reproductive organ of plants microscopically, will frequently have found pollen tubes emitted from the pollen grains covering the stigma; and which, as the stigma is not covered by the cuticle, may even have very *slightly* penetrated it; but only to this slight extent, because the stigma is not mature or in any way prepared to utilize it. Pollen may be induced by artificial means to emit its tubes, and will do so of itself under favourable circumstances, whether on a stigma or not. As an instance of this, I may say that I had or still have a microscopic slide containing grains of pollen of the common wall-flower (Cherianthus chieri) which I supposed to be quite dry when mounted, but which, from damp and warmth, emitted tubes some days afterwards. In another instance I found pollen on the stigma of *Lobelia* which had emitted tubes; but which, not being able to penetrate the unprepared surface, had raised the pollen grains so that they stood up on the face of the stigma like minute pins upon a cushion. I may perhaps add here a caution to young botanists, not to mistake this appearance on the stigma of *Wahlenbergia* for pollen grains so lifted up; the surface of that stigma being covered with globular headed glands, very likely so to mislead an inexperienced observer, into the supposition that they are pollen tubes partly penetrating the stigma.

NOTE ON A MEDUSA FROM THE TROPICAL PACIFIC.

BY R. VON LENDENFELD, PH.D.

In 1829 Eschscholtz (System der Acalephen, p. 89, pl. XI., fig. 1), described and figured a Medusa from the Tropical Pacific, under the name Gorgonia rosacea. This species has been subsequently placed in the genus Liriope by Gegenbauer (Versuch eines Systems der Medusen, p. 257.) Later writers as L. Agassiz and E. Haeckel, have adopted the view taken of this species by Gegenbauer (l.c.)

No specimens have however, been seen by all these authors, all copying the diagnosis of Eschscholtz.

Among the Medusæ collected by D. Richter of S.M. "Stosch," this species is represented by two fine specimens, which were both procured in the Phillippine Islands.

Both specimens are of equal size. Umbrella 5 mm. high and 9 mm. wide. They are consequently much larger than the specimen described by Eschscholtz.

Haeckel (System der Medusen I., p. 290), doubts the correctness of the statement made by Eschscholtz that this species has no "Zangenkegel," tongue cave.

In the two specimens, which I have examined no tongue was present, so that the diagnosis given by Eschscholtz appears correct in this respect.

CONTRIBUTIONS TO THE ZOOLOGY OF NEW GUINEA.

NOTES ON BIRDS FROM MOUNT ASTROLABE, WITH DESCRIPTIONS OF TWO NEW SPECIES.

BY E. P. RAMSAY, F.R.S.E., F.L.S., &c.

Having recently received a small collection of Birds from Mount Astrolabe on the S.E. Coast of New Guinea, I beg to offer some remarks thereon, with descriptions of two new species of Birds of Paradise.

LOPHORINA SUPERBA MINOR.

The specimens from the mountainous parts of the south-east end of New Guinea are smaller than those received from the north-west end of the Island, otherwise they appear to be much the same in coloration.

Adult Male.—A purple tinge from the ear-coverts, surrounds the nape below the steel-blue of the crown and occiput; the hind neck, mantle, and tips of the long plumes are distinctly oil-green, with a brassy tinge; the wings and tail are jet black and velvety, with a shade of purple or steel-blue on the upper tail coverts and the two centre tail feathers, the inner webs of the others blackish-brown. The chest-shield and its elongate plumes glossy steel-blue, or metallic green according to the light. The crown and occiput similar in tint, with a bar of violet purple about the middle of each feather. Under surface black, with a slight purplish-tinge; throat black, chin black with the anterior feathers elongated and directed forwards, reaching more than half-way to the tip of the bill. Bill, legs, and feet black.

Total length, 8·50 in.; wing, 5·40; tail, 3·90; tarsus, 1·30; bill from forehead, 1·10; from nostril, 0·70.

All the specimens examined are about the same size, and differ from those of Mount Arfak, and from the north-western parts of New Guinea, collected by Beccari and d'Albertis. On reference to the measurements they will be seen to be slightly smaller.

It is only fair to say that some months ago, I saw similar specimens in a collection made by Mr. Hunstein, who was, I believe, the first to discover this species in the south-eastern portion of New Guinea.

PAROTIA LAWESII. Sp. nov.

This species resembles the *Parotia sexpennis* (Bodd), but differs in the following particulars—the frontal white shield or crest is placed over the nostrils and on the forehead in a line with the bill, and *not* across or at right angles to it, the feathers from each side folded and recurved over a dividing line, which extends to the base of an olive metallic brown shield, which is placed between erect side plumes over the eye, the remainder of the feathers of the head of a more brassy olive tint; the occipital ridge or tippet-like crest of stiff elongated feathers are of a clear steel-blue, purple or violet, but no green tinge so conspicuous in *P. sefilata*, (Penn.) The broad chest shield of metallic feathers is of a much deeper tinge of brassy green, and of a firey orange tint in certain lights. There are other slight differences, such as the disposal to a greater or lesser extent of the metallic tints on the wings and tail, the spathulate or webbed tips of the elongated shafts from the ear-coverts are proportionately larger and broader, and the tail very much shorter. Bill black, legs and feet blackish brown.

Total length *(of skins)*, 9 inches; wing, 6 inches; tail, 3·2; tarsus, 1·7; bill from forehead, 1·25; from gape, 1·25: from anterior margin of nasal crest, 0·6; length of ear plumes, 6·3 inches.

The measurements of an adult male *Parotia sefilata* from Mount Arfak are as follows:—Total length, 13 inches; wing, 6·5; tail, 5·4; tarsus, 2·1; bill from gape, 1·5.

The specimens of this species were obtained on the slopes of Mount Astrolabe.

XANTHOMELAS AUREUS. Linn.

That this bird inhabits the south-east end of New Guinea, is proved by the occurrence of the feathers in various head dresses worn by the natives, which we have from time to time received from thence, they are sometimes worked together with the ear and nape plumes of *Parotia Lawesii*, and *Lophorina superba minor*, *&c.*

MYZOMELA ROSENBERGI., &C.

In the collection of specimens recently received, I found four adult males of this very distinct species.

The following species not hitherto recorded also occur :—*Trichoglossus papuana*, *T. josephinæ*, *T. pulchellus and T. muschenbrokii, and Chætorhynchus papuana.*

DESCRIPTION OF A NEW SPECIES OF COLLYRIOCINCLA, FROM THE SCRUBS IN THE VICINITY OF CAIRNS, QUEENSLAND.

BY E. P. RAMSAY, F.R.S.E., F.L.S., &C.

COLLYRIOCINCLA BOWERI. Sp. nov.

Adult Male.—All the upper surface dark lead-blue, wings and tail brown; all the under surface rufous inclining to chesnut, deepest in colour on the under wing-coverts, axillaries, abdomen, and under tail-coverts; chin inclining to ashy grey, an indistinct ashy grey spot in front of the eye; ear-coverts and sides of head like the back and upper surface; throat and chest with a distinct lead-blue shaft line down the centre of the feathers; bill and bristles black, legs and feet blackish lead colour. Total length *(of skin)*, 7·7 inches; wing, 4 inches; tail, 3·5 inches; tarsus, 1·1 inches;

bill from the forehead, 1·1 from nostril, 0·7 ; from gape, 1·2 inches. In form the bill is long and straight, narrow, slightly tapering and very slightly curved from the base to the tip. Measurements in the flesh. "Irides brown, bill black, legs bluish lead; length, 8¼ inches. December 12, 1884." B. B.

This species which I have named after its discoverer, T. H. Bowyer Bower, Esq., was found in the scrubs of the Cairns District, Queensland; it is quite distinct from any of the varieties of *C. rufigaster*, or *C. parvissima* of Gould.

NOTES AND EXHIBITS.

Mr. C. S. Wilkinson, F.G.S., exhibited a collection of recent shells, which had been obtained at depths of from 24 to 60 feet in sinking through the estuarine deposits of the Stockton, and Bullock Island and Wickham Coal Pits, and the Harbour Works near Newcastle. At a depth of 55 feet at Stockton a piece of wood 3 feet long and 1 foot thick was also found. Some of the specimens were collected by Mr. John Mackenzie, F.G.S., Mr. Cecil Darley, C.E., and Mr. J. Rossiter. One of the shells Mr. Brazier stated does not now live upon the Newcastle Coast, but it exists in Tasmania. A collection of shells from a similar deposit at the Maryville Colliery was exhibited before the Society a few months ago by Mr. J. G. Griffin. C.E.

Dr. Cox remarked that amongst the sub-fossils exhibited by Mr. Wilkinson, there was to him one of special interest, he referred to the *Syphonalia maxima*, Tryon. Hitherto this species had only been recorded from Tasmania, but he had recently ascertained that it existed also on the Victorian Coast near Port Phillip Heads. Dr. Cox considered that this sub-fossil tended to confirm the hypothesis that a colder climate prevailed at some not very remote period of this colony. The discovery also ot the *Voluta papillosa*, and *Cyprea umbilicata* for the first time on our coast by deep sea dredgings, and alive, led Prof. Wyville Thompson to conclude that these Molluscs had only migrated north, following some current of water of the same temperature as these species which were found in Tasmania.

Mr. Wilkinson also exhibited a collection of splendid specimens of Grasses and other Plants, including about 60 varieties from the Wonominta Station in the Albert District. They were collected and presented to the Society by Mrs. Robert Kennedy. Grass had scarcely been seen in this country during the past four years, owing to the drought; but since the late rains there has been a most luxuriant growth. Mrs. Kennedy has forwarded a duplicate collection to the Colonial and Indian Exhibition in London. Mr. Wilkinson considered that owing to the almost isolated position of the Barrier Ranges, some of the flora may be peculiar to the locality, and probably new and valuable fodder plants will be discovered there.

Dr. R. von Lendenfeld stated that he had discovered sensitive and ganglia cells similar to those which he had described as occurring in Calcareous Sponges, now also in the horny Sponges. In a species belonging to the Family *Spongidæ*, there exists an extraordinary lacunose tissue outside of that layer, which is homologous to the outer skin of other Sponges. By movements of the extremely fine membranes constituting this tissue the water current is regulated. In the lines where the membranes are joined, ganglia cells are found in small groups and apparently there belong a number of sensitive cells to each ganglia cell group. These cells are much larger than the corresponding elements of Calcareous Sponges.

Mr. Macleay exhibited some Fresh Water Fishes, which he had received from Mr. Charles Jenkins, L.S., of Yass. They consisted of specimens of the genus *Murraya*, Castelnau, an *Oligorus* of very remarkable form, and a remarkably elongate *Gadopsis*, all from the Little River in the Alpine Regions of the Murrumbidgee. Also, a species of *Galaxias* from the Yass River. He stated his intention of describing them at the next meeting.

The President exhibited, on account of the Rev. J. Milne Curran, the following specimens, to which some allusion had been made in his paper upon the Geology of Dubbo:—

1. Sandstone in an almost unaltered condition, ferruginous, and with a little lime and clay. It contains concretionary nodules and quartz pebbles.

2. Like No. 1, but with larger proportions of lime and clay, and no pebbles or concretions (in the specimen.)

3. The same stone in a condition of incipient metamorphism. Divisional planes inclined towards each other at various angles, indicate an approach to the crystalline condition. The grains of quartz still distinct.

4. Much the same as the last, but less marked in structure. Very friable.

5. Quartz and felspar separating. The quartz appears to have been at least partially re-deposited from solution, perhaps in water at a high temperature.

6. Has assumed the appearance of a granitic porphyry, with crystals of quartz. The fractures of the specimen pass through the quartz.

7. The felspar partially crystallized—Manganese present

8. Has almost the appearance of a quartz and felspar binary granite, though the structure is rather open or venicular.

10. A cube of the building stone described in his paper.

11. A slide of sand grains, illustrating their rounded and abraded character. From the Dubbo sandstone.

12 and 13. Thin sections of metamorphic sandstone or quartzite in which the several grains are very closely united. On examination by the polariscope these grains were shown to be perfectly crystallized, and not united by any colloidal silica.

Mr. E. P. Ramsay exhibited (1) some specimens of a new and large species of Ostracode *(Estheria)* from the Clarence River, collected by Mr. Goodrich. (2) Two fungi from the vicinity of

Mossgiel, received from Mr. K. H. Bennett. (3) A disc-shaped club of gold-bearing quartz, with sharp circular edge, used by the natives of New Guinea, in the neighbourhood of Mount Astrolabe.

Mr. J. D. Ogilby exhibited a new form of Blenny, allied to *Cristiceps* and *Clinus*, for which he proposed the new generic name of *Petraites*. It differs in the dental formula and fins.

Mr. E. G. W. Palmer exhibited two Moths of the Family *Bombycidæ*. The larva of one he found feeding on the Green Wattle (*Acacia decurrens*). The larvæ of the other, *Chelepteryx Collesii*, on various species of Eucalyptus. The moths of this latter prove to be all males, and took wing on the 6th of May in immense numbers in the neighbourhood of Burwood. The larvæ attain a great size and are covered with sharp spine-like reddish hairs, which are used in spinning their cocoons.

Baron Maclay called attention to the fact that the surprisingly low temperature of the blood in *Echidna hystrix*, to which he had previously called the attention of the Society, had been observed by Professor Owen forty years ago.

Mr. Whitelegge exhibited a very large and admirably mounted collection of 120 species of Mosses, 16 of which were new to Australia, and 26 to New South Wales.

WEDNESDAY, 24TH JUNE, 1885.

The President, Professor W. J. Stephens, M.A., F.G.S., in the chair.

MEMBER ELECTED.

The Rev. T. J. Hyder, Lawrence, Clarence River, was elected a Member of the Society.

DONATIONS.

"Zoologischer Anzeiger." Nos. 192, 193. From the Editor.

"Results of Rain and River Observations made in New South Wales during 1884." By H. C. Russell, B.A., F.R.A.S. From the Author.

"Note on an Aphidian Insect infesting Pine Trees, with observations made on the name 'Chermes' or 'Kermes.'" By W. M. Maskell, F.R.M.S. From the Author.

"Proceedings of the Cambridge Philosophical Society." Vol. V., Parts 1, 2 and 3. "Transactions." Vol. XIV., Part 1. From the Society.

"Report on the Progress and Condition of the Botanical Gardens and Government Plantations, Adelaide." From R. Schomburgk, Director.

"Science." Vol. V., Nos. 114-117, April 10th—May 1st, 1885 From the Editor.

"Bulletin de la Société Royale de Géographie d'Anvers." Tome IX., 4th Fascicule, 1884. From the Society.

"Victorian Naturalist." Vol. II., No. 2, June 1885. From the Field Naturalists' Club of Victoria.

"Annales de la Société Géologique de Belgique." Tome XI., 1883-4. From the Society.

"Meddelanden af Societas pro Fauna et Flora Fennica." Helsingfors, Finland. From the Society.

"Verhandlungen des Vereins fur Naturwissenschaftliche Unterhaltung zu Hamburg." Band V., 1882. From the Society.

"Feuille des jeunes Naturalistes." No. 175. From the Editor.

"Midland Medical Miscellany." Vol. IV., No. 41, May 1885. From the Editor.

PAPERS READ.

ROUGH NOTES ON THE NATURAL HISTORY OF THE CLAREMONT ISLANDS.

BY GERVASE F. MATHEW, R.N., F.L.S., F.Z.S., F.R.G.S., &c.

At three o'clock on the afternoon of the 12th of last month, "H.M.S. Espiègle" anchored off No. 5 (on the Admiralty Chart) of a group of small islands, called the Claremont Islands, lying inside the Great Barrier Reef, between Cooktown and Cape York, and in latitude 13·42 south. The group consists of eight principal islands, with a few islets, No. 1 being the farthest to the south in latitude 13·57 south, and just off Point Claremont, while No. 8, the farthest north, is in latitude 13·16 south, so that they extend for some 41 miles from north to south. They are low flat islands, more or less covered with scrubby brushwood, and with a few trees in the centre, and some of them are fringed with a belt of mangrove bushes. At the time of our visit these islands were looking beautifully green.

No. 5 having no name we will call "Espiègle" Island. It is one of the smallest of the group, being little more than one and a half or two miles in circumstance, and is covered with high grass, with patches of low bushes and a few trees at one corner of it. A sloping sandy beach runs round the greater part of it, and at low tide a large tract of coral flats and reefs, extending for several miles on each side of the islands is uncovered, and affords fine feeding grounds for numerous species of shore birds.

Soon after the ship anchored I landed in company with one of my messmates—Lieutenant Allenby—to explore the island and see what it produced in the way of sport or natural history. Allenby took his gun, but I contented myself with a butter fly net and a few collecting boxes. As we approached the island we noticed that most of the low bushes were covered with white and blue reef herons, as was also the beach, while feeding upon the reefs, which were then uncovered, were a multitude of shore birds. Some of the latter, as we drew nearer, became suspicious and took wing, and with loud cries moved off to a more distant point along the reef. Among them I recognized the familiar notes of the curlew, whimbrel, grey and golden plover, &c. Directly we landed Allenby went off after the birds on the reef, while I strolled up towards the bushes to look for Lepidoptera, &c. The reef herons were quite tame and permitted me to approach within a short distance before they took wing. While watching them a bevy of quail rose suddenly at my feet and quite startled me with the whirr of their wings as they flew off at an amazing pace for a short distance and then alighted abruptly among the high grass; and I almost regretted that I had not brought a gun.

There were many interesting plants growing a little way above high water mark, and some of them were in flower, but most of them, I am sorry to say, were unknown to me. However, there appeared to be several species of *Mesembryanthemum* and *Euphorbia*, and a plant which was exactly similar to, if not identical with, our English *Salsola kali*. But the commonest plant was a kind of Convolvulus, with fine pinkish-purple flowers and vigorous stems, which, in some instances, were to be observed creeping over the sand for sixty or eighty feet in a perfectly straight line. It was frequent all over the island, and is a plant which seems to flourish upon all the islands I have visited in the Western Pacific, for I have met with it commonly at Fiji, Tonga, Samoa, the New Hebrides, &c. It is a favourite food of the larvæ of *Protoparce distans*, a moth which is closely identical to *Sphinx convolvuli*.

A leguminous plant, much resembling our familiar garden scarlet runner, was creeping in profusion over the low bushes, and numbers of a small dark metallic-blue *Lycæna* were disporting themselves about it. They were in such swarms, and attached themselves so exclusively to this plant, that I suspected that it formed the food of their larvæ, so waited a bit and watched them, and presently observed a female settle upon one of the clusters of flower buds, and after crawling backwards and forwards once or twice over them and touching each individual bud with antennæ as if looking out for a suitable spot, she thrust her abdomen between two of the buds and deposited an egg at their base. After this I had no difficulty in finding larvæ of all sizes feeding in the flowers; the petals of all those attacked withered and drooped so that they could easily be detected. This *Lycæna* was the most abundant butterfly upon the island, but several other species were taken, as well as a few small moths, a list of which, as far as I have been able to determine, will be found at the end of this paper.

At six o'clock Allenby rejoined me. He had bagged twenty plovers and sandpipers of different kinds, and said that they were remarkably wild and that it was no easy matter to get within shot of them. On our way back to the ship a tremendous white shark followed the boat, and at one time I really thought it was going to attack us. It was a formidable looking monster, and must have been quite ten or twelve feet long.

The next day, 13th April, the ship remained at anchor all day off the island exercising at various drills &c., and I was able to get on shore directly after breakfast. I took a gun, butterfly net and some lunch, and having deposited the heavy gear beneath the shadiest tree, put some cartridges in my pocket and proceeded to beat the island for quail, &c. This took me about an hour, when I returned to the tree and rested for half an hour or so, and then went for a entomological ramble, returning to my tree again for lunch and rest, and so on until four o'clock, when I went on board. The time passed very quickly and pleasantly, though it was rather hot tramping through the long grass in a blazing sun. While eating my lunch, or dozing in the shade, the herons pitched in the tree above or upcn the bushes on each side, and seemed to scrutinize me very intently, and passed remarks to each other on my appearance and occupation in dismal croaks. I append a list of the birds met with.

White Nutmeg Pigeon (*Myristicivora spilorrhoa*, G. R. Gray.) Only one seen and shot. It was a young bird apparently not more than a couple of weeks from the nest, and much smaller than examples obtained at the North Barnard Islands in December 1882. Its plumage too, as far as I can remember, is slightly different, though this may perhaps be due to its youth.

Northern Swamp Quail (*Synoïcus cervinus*, Gould.) These little birds were tolerably plentiful lying in the high grass, but were difficult to flush, and generally allowed themselves to be almost trodden upon before they rose. Eight couple were bagged, and double that number might have been obtained had I had the services of a good steady retriever. Unless I marked the exact spot where the bird fell, and ran to it at once, it was almost certain to be lost, as they were so difficult to find in the thick grass. They usually rose five or six at a time, but it was quite out of the question firing a double shot as one of the birds would certainly have been lost. They varied a good deal in size, but I think I am right in referring them to the above species. They were excellent eating.

Oyster Catcher (*Hæmatopus longirostris*, Vieill.) There were several small flocks of these handsome birds. They looked very conspicuous when flying among a host of other shore birds. One I shot was a remarkably fine heavy specimen.

Grey Plover (*Squatarola helvetica*, Linn.) Common.

Golden Plover (*Charudrias orientalis*, Temm. et Schleg.) Numerous. This is decidedly much smaller than the European species, and by no means such a delicately flavored bird. All those that I have eaten have been obtained upon the sea shore, or upon coral reefs, where the nature of their food probably imparts a fishy flavour to their flesh.

Red-capped Dottrel (*Aegialophilus ruficapillus*, Temm) Common.

Allied Dottrel. (*Ochthodromus inornatus*. Gould.) This beautiful little plover, with its bright rufous head, and rufous band across the chest, was plentiful and conspicuous among the other species.

Barred-rumped Godwit. (*Limosa uropygialis*. Gould.) Common. Very near the European bar-tailed Godwit.

Curlew Sandpiper. (*Tringa subarquata*. Temm.) Common, and in breeding plumage.

Little Stint. (*Tringa albescens*. Temm.) A few seen.

Knot. (*Tringa canutus*. Linn.) Several shot, in breeding plumage.

Greenshank. (*Glottis canescens*. Gmel.) Common.

Grey-rumped Sandpiper. (*Gambetta pulverulentus*. Müll.) Numerous, but very shy and noisy.

Australian Curlew. (*Numenius cyanopus*. Vieill.) This fine species was not common, and was so wild that it was useless to try and get a shot at it. Its size and unusually long bill at once distinguish it from its European cousin, besides which its cry is slightly different.

Australian Whimbrell. (*Numenius uropygialis*. Gould.) Common. This is decidedly smaller than the European bird though its call note is identical.

White and Blue Reef Herons. (*Demigretta jugularis*. Forst.) (*Demigretta Greyi*. Gray.) These were the most numerous birds upon the island, and I believe them to be one and the same species, for I have constantly seen them in all stages of plumage passing from blue to white. There is no difference in their size or habits, and they are always found together. Unfortunately I have never been able to find them breeding, though there were plenty of nests upon the low shrubs on this island. Mr. Magillivray, quoted by Gould in his "Birds of Australia," is of opinion that the two forms are specifically distinct, and states that he has never seen any exhibiting a change from blue to white, or *vice versâ*, and upon Dugong Island he had seen the young white from the nest. I have seen them in this intermediate state of plumage at the New Hebrides, Solomon Islands, Tonga and elsewhere, and I do not think that the blue are adult birds.

Silver Gull. (*Bruchigavia Jamesonii* var. *Gouldi.* Bonap.) Only a pair of these birds were noticed, and they were very vociferous as I approached a certain point of the island, flying to and fro overhead in a very excited manner, as if they had a nest or young close at hand However, a careful search failed to disclose any. At times they came so near that I was able to observe them minutely. They were certainly larger than those to be seen every day in Sydney Harbour, and their beaks were of a dark brownish red, almost black at the tip, but otherwise I could detect no difference.

Caspian Tern. *Sylochelidon Caspia.* Brehm.) A pair seen.

Torres Straits Tern. (*Thalasseus cristatus.* Steph.) Common.

Little Tern (*Sternula nereis.* Gould.) Several of these elegant little birds were observed and one shot. They were perfectly fearless and darted down upon their prey within a few yards of the spot upon which I stood.

Pelican (*Pelecanus conspicillatus.* Temm.) Only one seen, and a magnificent bird it looked as it sat in solitary grandeur far out on the coral flats, its black and white plumage most conspicuous in the bright sun. I was anxious to obtain it, but it was very wary, and would not permit me to approach within a-half mile of it.

Little Cormorant (*Phalacrocorax melanoleucus.* Vieill.) Many seen flying over the island.

Amongst the scrub there were honey-eaters, fly catchers, two kinds of kingfishers, and several other species unknown to me; and from one of the trees I shot a pair of large handsome doves.

In addition to the shore birds enumerated above three or four examples were shot of a bird which to me appeared to be identical with the European dunlin (*Tringa variabilis.*) They were in summer dress. I was surprised to find so many of these birds still in their summer plumage at this time of the year, when I should have imagined that they would have been in their winter dress.

LIST OF LEPIDOPTERA OBSERVED AT CLAREMONT ISLANDS.

Rhopalocera.

Tachyris Ada. Only one example seen, but traces of their larvæ were very apparent upon a shrub with light pea green and slightly pubescent sub-ovate leaves, possibly a species of *Capparis.* In December last I bred many examples of this butterfly from larvæ found upon a similar shrub, at Port Moresby, New Guinea, This species, I believe, has not before been recorded from Australia.

Elodina. Sp. A pair.

Terias hecabe. Common, flying about a pretty kind of vetch.

Callidryas crocale. A male and female, in fine condition, were captured.

Lycæna. Sp. Very numerous, flying about a leguminose plant. (See remarks in body of paper.)

Lycæna platissa. Flying with above, but scarce.

Lycæna cnejus. Not common.

Lycæna. Sp. A very distinct species, and unlike anything I have yet seen from Australia. It was apparently only just coming out, for I only caught three—two males and a female—and they were in very perfect condition.

Precis zelima. Several.

Hypolimnas lasinassa. Several.

Ismene exclamationis. Several.

Pamphila angiades. Common.

Apaustus agraulia. Common.

Heterocera.

Pachyarches psitticalis. Only one example of this lovely pea-green Pyrale seen and captured.

Notarcha multilinealis. I did not see this in the perfect state, but bred two from larvæ taken feeding in curled up leaves of Hibiscus. It is a widely spread and very abundant species, occurring upon all the islands that I have visited.

Xinkenia recurvalis. Abundant amongst low herbage. This species appears to be cosmopolitan, for I have taken it in all parts of the world I have been to, except the extreme north.

Siriocanta testulalis. Common. I also bred one from a larva feeding in a head of *Mentha?* This is likewise a universally distributed species among the islands, and I have taken it near Sydney.

Pachyxancla mutualis. Common.

In addition to the above I captured several species of *Micro-Lepidoptera*, which are quite new to me.

AN AFTERNOON AMONG THE BUTTERFLIES OF THURSDAY ISLAND.

By Gervase F. Mathew, R.N,, F.L.S., F.Z.S., F.R.G.S., &c.

The following account of an afternoon's collecting among the butterflies of Thursday Island, on 18th of April 1885, may perhaps be of interest, as it is a spot, I suspect, which is not often visited by an entomologist.

Thursday Island is the central and smallest of a group of islands lying in Torres Straits, off the North Coast of Australia, and situated between latitude 10·30 and 10·58 south, and 146·6 and 142·20 east longitude. The other islands of the group are Hammond, Goode, Wednesday, Friday, Horn, and Prince of Wales Islands, with numerous small islets. Prince of Wales Island is the largest, being eleven miles long, by ten miles broad. They are all hilly, and the hills, from the sea, appear to be densely wooded, as are also the valleys between the hills. Most of the islands possess numerous small bays, some of them with an ample sandy beach, while others are fringed with belts of mangrove bushes. In some of the islands, between the ranges of hills, there are wide plains but thinly wooded with eucalypti, and, after the rainy season covered with high grass. Springs of water are to be found on nearly all the islands throughout the year, and after the rains there is generally a profusion in the gullies and water holes. Thursday Island being so small is but poorly provided, and the inhabitants store up rain water in tanks to meet their necessities during the dry season, the water in the water holes being unfit for human consumption.

Thursday Island is one and a half miles long by about three quarters of a mile wide, and has a range of hills running half way through it in a north easterly direction, divided by a moderately broad valley crossing the island from north to south, and beyond this again there is a range of hills in the north east corner of the island, and another range in the south east corner. The highest point is 374 feet high. The settlement is situated upon Vivien Point, the south west extremity of the island, and extends along the beach for about half a mile from thence. The whole island is surrounded by a coral fringe reef.

After lunch I went on shore with three of my messmates, Lieutenants Ommanney and Allenby, and Mr. Hunter, midshipman. The two former I provided with nets and boxes, as they were anxious to help me to, as they said, complete my collection of the Australian butterflies, as this would be the last opportunity we should have of landing in Australia. We landed on the beach a little to the north east of the settlement, and walked to the valley which intersects the island, and across this to a range of hills which lie in the north east corner, and whose highest point, Rose Hill, is 223 feet. The valley was sparsely clothed with trees, the chief of them being Eucalypti, Casuarina, Banksia, Persoonia, &c. Grass was abundant everywhere and in some places, especially at the edge of the forest, was breast high. There were also a few small acacia and cassia bushes, and some others I am unacquainted with, and here and there patches of vetches and other leguminose plants. The ground in many places was thickly strewn with volcanic blocks of stone, and these, hidden among the grass, made walking dangerous and unpleasant, and running almost out of the question. Most conspicuous objects in this valley were the cone-shaped or castellated dwellings of the Termites. Some of them were from ten to twelve feet high, and eight or ten feet in circumference. They were evidently all inhabited for several pinnacles we kocked off were swarming with ants. The galleries were full of vegetable matter which apparently consisted of a mixture of bits of dead leaves, grass seeds and wood dust. The nests were composed of agglutinated sand, and were as hard as sand stone itself. It is astonishing how these little creatures can construct such wonderful dwellings. They must be several years raising one to a height of ten feet, for besides these large dwellings there were a number of smaller ones in course of erection, some only a few inches above the surface of the ground, but they had all an old weather beaten appearance. The galleries looked as if they had been lined with a dark reddish-brown shining substance, though this might have been produced by the traffic of such multitudes of insects constantly running to and fro.

The first butterflies we saw were *Junonia orithya* which were fond of settling on bare patches on the ground, but they were so wary that they were very difficult to catch. There was a strong breeze blowing, and directly they took wing they were carried off at a great pace. Some of the eucalypti trees were in flower and proved attractive to several species of butterflies notably *Papilio Polydorus* and *Eurycus cressida*, butterflies which are very similar in habits and appearance when on the wing. One evidently mimics the other, and they fly in a slow floating manner, and are seemingly easy to catch. However, to day in this particular locality they were flying high out of reach among the topmost branches of the trees. Occasionally one descended and crossed the opening to another tree. This afforded a chance, and a rush was made after it, and it was amusing to watch how easily it avoided the frantic strokes of the net, and reached its goal in perfect safety, while its would-be captor stood still beneath the tree hot, panting, and probably with bruised shins, and in bad French, blessed *Polydorus* who was again feasting unconcernedly aloft. By the way has anyone noticed how closely *Papilis anactus* mimics *Acræa Andromache* in its flight and general appearance? I have upon several occasions mistaken the two, the former flying in the weak straight manner of the latter, and the colours and pattern of both somewhat resembling each other. Among the grass were several species of *Terias*, *Satyridæ*, *Lycænidæ*, and *Hesperidæ*, and also a few *Noctuæ*, *Geometræ*, and *Pyrales*, but on the whole *Micro-Lepidoptera* were far from plentiful.

As soon as we reached the edge of the forest the aspect of affairs changed, and butterflies became decidedly more numerous. Here we separated my companions keeping outside, while I scrambled up the side of the hill until I got well within the shelter and shade of the trees. It was difficult walking for the ground was covered with large loose stones, which were more or less hidden by the undergrowth so that it was necessary to be careful and look where one was going to. Once or twice I narrowly escaped a fall as I was eagerly pursuing some attractive species, and usually, upon these occasions, the insect was lost, and I found it a much better plan to walk along quietly or stop altogether when I reached a likely-looking spot, for butterflies often come quite close if one keeps perfectly still. The most abundant species in the forest were *Papilio Polydorus*, *Hypolimnas alimena*, and *Euplœa Sylvester*, but perhaps I had better at once proceed to give a list of the species seen and captured with remarks thereon, instead of a rambling disconnected account.

Ornithoptera Priamus. Linn., var. *Pronomus.* Gray. Three or four of these most magnificent butterflies were seen, and a pair, a male and female in perfect condition were captured. I was also fortunate enough to find two chrysalids and two full grown larvæ, and saw many smaller larvæ which I did not take as their food plant will not keep fresh for more than a couple of days on board ship. The larvæ were feeding upon a kind of *Ipomœa* which was twining itself among and over the brushwood, some at a considerable height while others were feeding upon portions of the plant which were trailing on the ground, and I nearly trod upon one of the largest larvæ. The following is a description of a full grown larva.

Length two and a-half inches; tapering slightly towards each extremity; central segments thickened; comparatively short and obese; smoky black with a tinge of madder purple; head black and shining, with a narrow white v-shaped mark on face; upon the crown of the second segment a crescent-shaped shining black plate, and between this and the head is the nuchal aperture, through which, when the larva is irritated, is emitted a pair of short thick carmine-coloured tentacles; a subdorsal row of finely pointed spines on each side, the spines rather long, and those on the posterior segments pointing backwards; tips and base of spines black, intermediate portion scarlet; except on eighth segment, where the base of spine is white and from thence springs a broad oblique white stripe pointing forwards and terminating at the spiracular region; a row of black spines just below the spiracles; upon third, fourth, and fifth segments an additional spine between the subdorsal and spiracular row; a short black blunt tubercle on second segment upon each side of the face; a short black spine above each leg and claspers, which are shining black. The chrysalis, which is of an amber brown colour, is slightly angulated, with a blunt subdorsal black-tipped spine on each side of the abdominal segments, and some small black spines on back of thorax; a large and almost triangular orange-yellow blotch upon back of anterior abdominal segments; wing sheaths dark reddish-brown, with the nervures well-marked.

These larvæ differed in no way from larvæ I have taken at the Duke of York Islands and New Britain, and which produced the blue variety *Urvilliana*, Guer., and the usual golden-green form, and I feel quite convinced that Kirby is correct in referring the five Australian varieties, and several others from New Guinea, Woodlark Island, Batchian, &c., to *Papilio Priamus*, Linn., of which there is little doubt that they are merely local varieties. The Chrysalids are also indentical. Those I found were attached to the midrib of a very large leaf of some forest tree, and sometimes at a considerable distance from the food of the larvæ. Before suspending itself the larvæ takes care to securely fasten the stem of the leaf at its base to the branch of the tree with strong threads of silk.

Papilio Polydorus, Linn. One of the most abundant species met with. It flies in a light airy manner, generally quite straight like *Eurycus* or *Acræa* and appears to be a particularly easy butterfly to catch, nevertheless it has a trick of dropping suddenly, or twisting to one side, as one makes a stroke at it, and instead of having it in your net, as you confidently expected, you see it hurrying off among the brushwood or careering aloft far out of reach

Papilio erithonєus. Cram. One or two seen.

Papilio capaneus. West. Several observed, and one or two worn specimens captured. Young larvæ upon.

Papilio erectheus. Don. Common, and larvæ of various sizes upon orange trees in the garden of Mr. Chester, P.M.

These specimens were of the New Guinea form, which is larger and rather differently marked than those from New South Wales.

Papilio Sarpedon. Linn. Several seen. A rapid flyer.

Papilio Agamemnon. Linn. Two or three seen and one captured.

Eurycus cressida. Fabr. Numerous.

Terias australis. Wall. }
Terias hecabe. Linn. } Common amongst high grass, &c.
Terias. Sp. }

Pieris ega. Boisd. One male only.

Callidryas crocale. Cram. Several.

Danais affinis. Fabr. Not uncommon in the forest where it was fond of alighting upon the extremities of dead twigs, a habit which is common to all the *Danainæ.*

Danais Petilia. Stoll. Common, but local.

Euplœa sylvester. Fab. Very common in the forest where it delights to sit in little family parties upon some dead bough.

Euplœa. Sp. Possibly a local variety of *tulliolus*, Fabr.

Junonia orithya. Linn. Common, but very wary and difficult to catch.

Junonia vellida. Fabr. Common.

Precis zelima. Fabr. Several.

Rhinopalpa sabina. Cram. This fine species was not uncommon in the forest, and was in good condition. They were usually to be found in pairs, though sometimes they were in family parties of six or seven, and were fond of settling upon the underside of a large leaf near the ground, and flew out suddenly as one passed. As a rule, if one kept quiet, they almost invariably returned to the same spot.

Doleschallia bisaltidæ. Cram. Common. This butterfly, during the hottest part of the day, flies high and keeps well out of reach, but towards the evening, or when passing clouds obscure the sun, it descends and may then often be seen at rest on the underside of a leaf, when they may be easily caught if one approaches quietly. They are very pugnacious in their habits. One will take up its position upon a leaf at the extremity of some lofty branch and from thence starts off and gives battle to every passing butterfly, returning, after the encounter, to its original position.

Hypolimnas alimena. Linn. Plentiful and in fine condition.

Hypolimnas lasinssa. Cram. Common.

Neptis consimilis. Boisd. This pretty species was tolerably numerous. It flies in a very airy manner, giving three or four flaps with its wings and then floats gracefully to a leaf where it settles with wings fully expanded.

Neptis Shepperdi. Moore. The above remarks apply to this species also.

Melanitis Leda. Linn. A few only.

Mycalesis Perseus. Fabr. A few, but in poor condition.

Mycalesis terminus. Fabr. Common and in fine condition. These two species were found among high grass by the edge of the forest.

Ypthima arctous. Fab. Common with the above.

Cœnonympha. Sp. Common. This species also occurs near Sydney; but is unnamed in the local collections I have had access to.

Lycæna platissa. Herr. Schaff. Common.

Lycæna Salamandri. Macleay, W. A few.

Lycæna pygmæa. Snell. One example.

Lycæna. Sp., near *Erinus.* Fabr. One only.

Lycæna. Sp. Three examples.

Lycæna. Sp. One example.

Hypochrysops anacletus. Feld. Three specimens of this beautiful species.

Hypochrysops Apelles. Fabr. One example.

Hypolycæna phorbas. Fabr. Several.

Amblypodia centaurus. Fabr. This brilliant species was common flying to and fro in front of low bushes. It was difficult to obtain in good condition as it is very pugnacious in its habits, and both sexes are to be continually seen engaged in warfare.

Amblypodia micale. Blanch. Two or three.
Ismene exclamationis. Fabr. Several.
Ismene. Sp. Several.
Pamphila augiades. (?) Feld. Several.
Pamphila. Sp. One or two.
Pamphila. Sp. Several.
Apaustus agraulia. Hew. Common.

The above forty-eight species were the result of an afternoons collecting at I believe a not very favorable time of the year. If so much was done in such a short time it is reasonable to suppose that the list would have been very much increased if I could have had a few more days collecting and if it had been at a more favorable time of the year. From what I saw of Thursday Island I should judge that the larger islands, which are all well wooded, particularly Prince of Wales Island, would produce a greater variety of *Rhopalocera*, and all the species that have been taken at Cape York and other parts of the North Coast of Australia would be found upon them as well as many New Guinea species which up to the present time have not been recorded as Australian. I can imagine no better place than Thursday Island for a collector to make his head quarters for a couple of months for there could be no difficulty in working the other islands as they are all easily accessible by boat, and there are houses upon all of them so that comfortable accommodation could most likely be obtained. I am confident that many new species would reward a diligent collector.

In the above list it will be observed that many common species that ought to occur on this island were not observed upon this occasion, such as *Pieris teutonia*, *Danais chrysippus*, *Danais erippus*, and others.

NEW FISHES FROM THE UPPER MURRUMBIDGEE.

By William Macleay, F.L.S., &c.

At the last monthly meeting of this Society, I exhibited four species of Fishes from the streams forming the upper waters of the Murrumbidgee. They had been collected and sent to me by Charles Jenkins, Esq., of Yass, a gentleman well known to this Society by his Papers on the Palæontology of that district. One of the four Fishes is a *Galaxias* taken in the Yass River; I believe it to be a species hitherto undescribed, but in the absence of sufficient evidence of a conclusive kind I shall postpone, for the present, giving it a distinctive name. Another of the Fishes, a *Gadopsis*, taken in the Little River, I shall treat in the same way. One species of *Gadopsis* only has been described. It is found in rivers in Tasmania, Victoria, and New South Wales, but I have long thought that those of the genus found in the western rivers of New South Wales were of much more elongate form than the original *Gadopsis marmoratus* of Tasmania. I must defer, however, any attempt to solve my doubts, until I can procure some specimens of the Fish from Tasmania. The other two Fishes are undoubtedly new and are here described.

OLIGORUS GIBBICEPS. n. sp.

Of rather elongate form, and slightly compressed. The line of the back is straight from the top of the head to the tail. The height of the body is one-fifth, and the length of the head is one-fourth of the total length. The head descends almost vertically in front of the eyes to the mouth, which is horizontally protruded, the lower jaw being the longest. The maxillary extends backwards to below the middle of the orbit; the eyes are large, lateral and near the top of the head. The dorsal and anal spines are larger proportionally than in *Oligorus Macquariensis*, there seems also to be a difference in the character of the speckled marking, which in this species seems to be formed of short angular linear or semi-circular spots.

One specimen, nearly 8 inches long, is all I have ever seen or heard of, of this very extraordinary looking Fish. It was captured in the Murrumbidgee River in the neighbourhood of Yass. The most striking feature is the head, but its elongate form and straight back also show a marked difference from the other species of the genus.

MURRAYIA JENKINSI. n. sp.

D. 11/12. A. 3/8. L. lat. about 50.

Of compressed form; the height of the body one fourth of the total length. The profile descends in a regular slope from the 1st dorsal spine to the snout, which is rounded and tumid; the mouth is small; the eyes rather large and about two of their diameters apart. The head is, with the exception of small scales on the cheek and operculum, entirely naked, and covered with large rounded pits, similar pits extend in a double row on the lower limb of the preoperculum, and to a more limited extent on the posterior limb; the maxillary scarcely reaches to the vertical from the anterior margin of the eye. The preoperculum is straight behind and densely serrated, the serrations become a little longer at the angle, and larger and more distant on the lower edge. The operculum has the lower spine which is the largest of the two, bifid, the upper branch the shortest, the other spine is broad and flat, the lower edge of the operculum is finely and densely serrated; the caracoid and scapular are also serrated. The dorsal spines are strong, the fifth is the largest; the anal spines are also strong, thesecond strongest and slightly longer than the third. The first ray of the pectoral fin is elongate. The lateral line is almost straight, the scales of moderate size.

It is difficult to guess even at what the coloration has been, as in addition to the fish having been long in spirits, most of the scales have been rubbed off, but it seems to have been silvery-grey, with many very minute black dots.

The only specimen of this fish I have seen is about 5 inches long, and was taken in the Murrumbidgee in the Yass District. The genus *Murrayia* was formed by Count Castelnau a number of years ago, for the reception of some fishes which he had received from the Murray River or some of its ana-branches in the Deniliquin District. He described three species:—*Murrayia Guntheri*, *cyprinoides*, and *bramoides*, all from the same locality, and averaging from a foot to 14 inches in length. I have never seen any of them, and indeed the fish I have now described is the only one of the genus I have seen, although I resided for many years on the banks of the Murrumbidgee. The genus is a very good one, and shows a decided affinity to the genus *Ctenolates* of Gunther.

DESCRIPTION OF A NEW *DIPLOCREPIS* FROM PORT JACKSON.

By J. Douglas-Ogilby,

Senior Assistant Zoologist, Australian Museum.

Diplocrepis costatus. sp. nov.

D. 8. A. 7. V. 1/4. P. 26. C. 12.

Length of head $3\frac{3}{10}$, of caudal fin $6\frac{3}{10}$, height of body above vent 8, in the total length. Greatest breadth of head $\frac{3}{4}$ of its length; it begins to narrow beyond the posterior margin of the eye, and is produced into a pointed snout, which is one-fourth of the length of the head. The eyes are slightly prominent, large, $\frac{1}{5}$ of the length of the head, and equal to the interorbital space, which is flat. The nostrils are close together, near the upper front angle of the orbit, the anterior provided with a tentacle. The maxilla reaches to the vertical from the front margin of the eye. Lower lip with a skinny flap posteriorly. The upper jaw is the longer, and is armed with an outer band of strong recurved canines, the largest being at the symphysis, and on the middle of the sides; behind this row is a patch of villiform teeth, broadest anteriorly. In the lower jaw is an anterior band of moderately strong teeth, mingled with smaller ones, and a lateral row which terminates in four very strong canines. The dorsal fin commences one-fifth nearer to the tip of the tail than to that of the snout, and the distance of its origin from that of the caudal is exactly one-third of its distance from the snout. The anal commences slightly behind the dorsal, and both fins are entirely disconnected with the caudal, which is rounded. Pectorals rounded, with a broad fleshy base, and connected by a membrane with the ventrals, which consist of a spine, entirely hidden beneath the skin, and four rays. The disk between them is longer than broad: that attached to the coracoids broader than long, and with a small angular cutaneous flap behind; the hardened epidermis entirely surrounds this disk, and is composed of series of circular plates with a central hollow, much resembling miniature disks; of these there are about four rows anteriorly and eight rows posteriorly, those on the inner side being always the largest; on the ventral portion of the disk these plates are arranged in a narrow band, and are very minute in front, but are large and in about seven series on the anterior membranous part of the ventrals, and their outer rays almost to their tips; the posterior edge of this portion of the disk is without plates, the length taken up by the entire sucking apparatus is exactly one-fifth of that of the fish. The vent is situate considerably behind the middle of the fish, and much nearer to the origin of the anal fin than to the posterior margin of the disk. There is a small genital papilla behind the anus. The coracoid flap extends upwards to fully three-fourths of the base of the pectoral, and is joined to the side by a median transverse web.

Uniform pink, appearing almost transparent when first removed from the water.

The example from which the description has been drawn up, was taken by the trawl on Shark Reef, Port Jackson, upon the 30th of May, and gives the following measurements.

Total length	25	lines
Length of head	7½	„
Origin of dorsal to snout	15⅓	„
Origin of dorsal to origin of caudal ...	5⅙	„
Anus to snout...	13¾	„

There are about 10 strongly marked vertical ridges on each side, caused by the contraction of the muscles after death, but not present in the living fish; owing to this peculiarity, which is common to its congener, *Diplocrepis puniceus*, Rich., from New Zealand, I have proposed *costatus* as a suitable specific name for this interesting form.

From Richardson's fish it differs greatly in the number of rays in the vertical fins, the narrowness of the head, the smaller eye, the position of the dorsal and anal fins, the shape of the plates on, and small size of, the disk, the position of the vent, and the coloration. Its strong dentition separates it at once from *Crepidogaster* and *Trachelochismus*, but curiously enough its fin formula is similar to that of the latter, from which however it differs greatly in the shape of the head, &c. It is very interesting to observe how our east coast species possess greater affinities to the two New Zealand than to the more southern and western *Crepidogaster*

Since writing the above I have found a much smaller example, but 1⅓ inches long, in which the fin formula, measurements, and general characters exactly correspond with those of the larger individual. Registered number of type B. 7140.

JOTTINGS FROM THE BIOLOGICAL LABORATORY OF SYDNEY UNIVERSITY.

By William A. Haswell, M.A., B.Sc.,
Lecturer on Zoology and Comparative Anatomy, &c.

1. On a destructive Parasite of the Rock Oyster.

I was requested some time ago by Dr. Cox, the President of the Fisheries Commission, to examine some samples of oysters from the Hunter River beds, which appeared to be dying in large numbers owing to the attacks of some parasite. On examining the specimens which I received, I found that most of them, when opened, presented on the inner surface of the shell one or more discoloured blisters. In some these raised discoloured patches were of small extent, with a narrow sinuous form, while in many instances a large part of the valve was affected. In some cases, where the extent of the shell invaded was not large, the oysters did not seem at all affected by it; in other cases the animal was found to be dead, and in a few cases the shell was completely empty.

A very slight pressure suffices to break open the blisters, which are covered only by a thin layer of nacreous substance, and their interior is found to be occupied by fine black mud. In the earlier stages, instead of a fair-sized open cavity, there is merely a narrow tunnel bent upon itself, excavated in the substance of the shell, and opening on the exterior at the edge of the valves; but where the mischief has spread further the greater part of the substance of the shell beneath the blisters has become more or less disintegrated and readily splits up into soft laminæ, with often an infiltration of fine mud between them. In almost every instance I found in the interior of the cavity one or more specimens of the little animal by which the mischief had been effected,—a very small annelid of the genus *Leucodore* or *Polydora*.

Species of this genus have been long known as accustomed to burrow in the shells of Molluscs—among others of the oyster—as well as in any sandstone, or shaley, or calcareous rock; but they do not seem to have been regarded generally as serious enemies of the oyster.

Oersted (1) does not mention the boring propensities of *Leucodore* at all, but merely describes it as found on a sandy bottom. Grube (2) describes it as perforating cretaceous rocks at Dieppe. In his "Histoire Naturelle des Annélés," Quatrefages does not allude to the shell-invading habits of the genus, but describes it as either living in delicate tubes, or in burrows in sand or calcareous rock. But MacIntosh, in a paper "On the boring of certain Annelids" published in the Annals and Magazine of Natural History, for 1868, mentions that he had observed *Leucodore ciliata* burrowing in the shells of various molluscs, among others in those of the oyster. I have not been able, however, to find any record of such extensive destruction of oysters effected by this little annelid on the European coast as seems to be taking place on the Hunter River (3), where no doubt some local circumstances, such as muddiness of the water produced by increasing traffic, tend to decrease the vital powers of the oysters and thus favour the inroads of the parasites.

The species which is found most adundantly in these oysters from the Hunter River beds is, strange to say, identical with the European *Polydora ciliata* of Johnston (4).

I found, however one specimen of a second species which appears to be very distinct and of which I append a description.

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(1) Annulatorum Danicorum Conspectus, Fasc. I.

(2) Beschreibungen neuer oder wenig bekannter Anneliden.

(3) Prof. Huxley, in a popular article on the oyster in the "English Illustrated Magazine" of last year, mentions that he had received from Sir Henry Thomson specimens of oysters which were invaded by a species of *Leucodore*, but adds that the oysters seemed little the worse.

(4) Claparèdés *P. Agassizii* is apparently the same as *P. ciliata* (Annélides Chetopodes du Golfe de Naples, p. 314, pl. XXII., fig. 1.)

POLYDORA (LEUCODORE) POLYBRANCHIA. N. S.

The head is of the same breadth behind as the segments of the body. In front it becomes rather narrower, and ends anteriorly in two low triangular lobes separated by a wide notch. There are four very small rounded eyes. Running backwards from the mouth is a narrow groove continued as far as the third segment. The branchiæ begin on the second segment of the body. The large setæ on the fifth segment are ten in number and arranged in two sets which differ from one another in shape and in direction. The five which are directed towards the ventral aspect of the animal end in a broad head having the form of an inverted cone with an oblique base; on the base of the cone are one or two small conical elevations. The five which are directed more towards the dorsal side are not so broad at the end and are gently curved in the form of a hook with a blunt apex. The ordinary setæ and uncini are precisely similar to those of *P. ciliata* as figured by MacIntosh. The uncini or hooked setæ begin on the seventh segment; there are from six to ten of them on each parapodium, all with the apex directed outwards, except the most external, which is very short, and has the apex directed inwards. Some of the setæ of the anterior parapodia are very long and filiform.

The setæ are not unlike those figured by Ray Lankester (Ann. Mag. Nat. Hist., (4th series) Vol. I., 1868) as those of *P. calcarea*, and regarded by MacIntosh (1) as belonging to a variety of *Polydora ciliata*: but apart from the form of the boring setæ, the presence of branchiae on all the segments, together with the absence of cephalic tentacles, seems to distinguish the present species from all hitherto described forms. *Polydora cæca* of Oersted (2) resembles it in having "branchias in utroque corporis parte," but has long præstomial tentacles.

The only southern species of *Polydora* described is *P. socialis* of Schmarda (3) which has a pair of well-developed tentacles.

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(1) Ann. Mag. Nat. Hist., 1868.

(2) "Zur Klassification der Anneliden." *Vide* Quatrefages, Hist. Nat. Ann. II., p. 302.

(3) Neue Wirbellose Thiere. I., ii., p. 64, pl. XXVII., fig 209.

2. ON SOME RECENT HISTOLOGICAL METHODS, AND THEIR ADAPTATION TO THE TEACHING OF PRACTICAL HISTOLOGY.

Some methods, recently described, of dealing with objects intended for histological examination are not only great boons to the original worker, lessening greatly the drudgery of manipulations, and enabling him to prepare and examine a large amount of material in a comparatively short time; but are, in certain instances, of great service also to the teacher of histology, as, when perfected, they will enable him to supply the largest class without much loss of time with a uniform series of preparations so preserved and stained as to bring out all the main points in their microscopic structure. A short account of my experience of some of these methods in connection with class work, will perhaps be of service to others who have to do with the teaching of natural science.

STAINING WITH HÆMATOXYLIN.

Objects which have been hardened by any of the usual methods, after having been at least a fortnight in alcohol, are best stained *en bloc* by an aqueous solution of crystallised hæmatoxylin, followed by bichromate of potash as recommended by Heidenhain. (1) For most organs and tissues, pieces half an inch square, are most successfully and uniformly stained through by means of a ½ per cent. solution of hæmatoxylin allowed to act for 10 to 24 hours; the staining agent is followed by a 1 per cent. solution of bichromate of potash, which should be allowed to act for two or three hours. It is quite impossible, I need hardly add, to lay down any precise rule as to the time required for staining satisfactorily portions of any given organ; though twenty-four hours immersion in a half-per-cent. solution of hæmatoxylin will, in the majority of cases, give satisfactorily results, in some instances the object will be rendered too black, and in others will be found not to be stained throughout. The tissues which require the most prolonged staining, when hardened by one method, may become much more rapidly coloured when treated in another way. It will, therefore, be found necessary, in order to insure good specimens of all the organs, to take several pieces of each prepared in different ways and subject them all to the same process of staining, or else, taking several pieces of each specimen, to subject each of them to the action of the staining fluid for a different interval. The results obtained by this method excel, in my opinion, in the definiteness of the cell-outlines, and the distinctness of the differentiation of the tissues any that can be obtained by any of the ordinary process of staining capable of being carried out in a class.

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(1) Pflüger's Archiv., XXIV. (1884), p. 468.

EMBEDDING IN PARRAFIN.

Specimens of animals or of organs stained as above described *en bloc* and afterwards treated with bichromate of potash, require, after soaking for a few minutes in distilled water, to be treated with strong alcohol for several days—absolute alcohol being used for at least the last two days—in order completely to remove the water with which they have become saturated. As in staining so also in the embedding both time and material are saved by preparing a large number of specimens—say twenty or more—at one time. The alcohol is then replaced by chloroform. If the objects are delicate and complicated, this will be very conveniently and thoroughly effected by using some such contrivance as the chloroform box which I employ. This is an oblong brass box divided internally by a vertical partition, which does not reach the bottom, but leaves an opening of three-quarters of an inch, into two compartments. Chloroform with a slight admixture of sulphuric ether is poured into the box until it rises a little above the lower border of the vertical partition. Absolute alcohol is gently poured in by means of a pipette on the surface of the chloroform in one of the compartments; the objects are placed in this, and, as they become saturated with the chloroform, they sink down until they drift through below the partition into the other compartment, which contains only the mixture of chloroform and ether. From this they can be taken out without disturbing the equilibrium of the alcohol and chloroform Ordinary objects may simply be transferred from absolute alcohol to chloroform and kept in the latter for twenty-four hours, or until saturated. Saturation with paraffin is then effected by the well-known method of Giesbrecht. I use a special water-bath with troughs divided into a number of compartments. To ensure a good result equal parts by volume of chloroform and paraffin (of low melting point) should be used, and the objects should be left in the bath at the temperature of the melting-point of the soft paraffin for about twenty-four hours.

To ensure sufficiently fine and delicate sections to obtain the full advantage of the process of staining described above, Caldwell's or some other good form of automatic microtome must be employed, a coating of soft paraffin round the hard in which the object is embedded being added, according to Caldwell's invaluable process, to prevent curling and secure series if required. Sections so prepared and cut can be kept unaltered for an indefinite length of time.

To prevent the sections breaking up or becoming disarranged during the process of mounting in balsam, it will be found desirable in most cases to fix them down to the slide. For this purpose the best agent is Caldwell's shellac dissolved in creosote, which gives much better results than the gum arabic which I previously used and recommended.

3. MINUTE STRUCTURE OF *Polynoë.*

In a short paper in the *Zoologischer Anzeiger*, Jordan has recently described the histological structure of the scales of *Polynoë* as revealed by making series of sections. His figures and description agree exactly with what I find to exist in species which I have examined, except that he omits to notice certain cells which I find in the tissue of the scale. The nerve which enters the elytron ramifies through the scale and the ultimate twigs mostly end in minute processes on the surface. Just before the nerve twig enters this end-organ it passes through a little ganglion. These ganglia are mostly composed (and Jordan represents them as entirely composed) of small nerve-cells similar in form to the ganglion-cells of the ventral nerve-cord but considerably smaller. But here and there, if not in all the ganglia, are to be found cells of a different kind. These are bipolar cells of finely granulated appearance with large vesicular nuclei, $\frac{1}{1000}$th of an inch in diameter, and thus about thrice the size of the ordinary cells. Cells of precisely similar form are found in groups at the bases of the dorsal cirri, so that it seems unlikely, as might otherwise be reasonably held, that they have any direct relation to the production of the phosphorescence for which the elytra are remarkable.

In sections of male specimens of *Polynoë* it will frequently be found that the cavities of the segmental organs are densely packed with spermatozoa ; and in some instances this will be found to be the case when there are no spermatozoa remaining in the perivisceral cavity itself. This fact, together with the observations which I have repeatedly made of the passage outwards of the spermatozoa through the efferent ducts, must set at rest entirely the question of the chief function of these organs.

NOTES AND EXHIBITS.

Mr. Haswell exhibited specimens of *Alepas parasita*, Quoy and Gaimard, a barnacle which is parasitic on large Scyphomedusæ. The specimens were obtained from Mr. Alex. Moreton, Curator of the Hobart Museum.

The President exhibited a specimen of *Glossopteris Browniana* found in a large pebble of the Hawkesbury drift, derived from some portion of the upper coal series which had been hardened by volcanic activity in its vicinity.

WEDNESDAY, 29TH JULY, 1885.

The President, Professor W. J. Stephens, M. A., F.G.S. in the chair.

DONATIONS.

"Mittheilungen aus der Zoologischen Station zu Neapel." Sechster Band, 1 Heft. From the Director.

"Proceedings of the Zoological Society of London." Part IV., 1884. From the Society.

"Zoologischer Anzeiger." Nos. 194-195. From the Editor.

"Archives Néerlandaises des Sciences exactes et Naturelles." Tome XIX.. Livr. 4 and 5, 1884. From La Société Hollandaise des Sciences á Harlem.

"Journal of Conchology." Vol. IV., No. 10, April 1885. From the Conchological Society of Great Britain and Ireland.

"Journal of the New York Microscopical Society." Vol. I., No. 4, April 1885. From the Society.

"Annual Report of the Board of Directors of the Zoological Society of Philadelphia." 1884. From the Society.

"Proceedings of the Academy of Natural Sciences of Philadelphia." Part I., 1885. From the Society.

"Science." Vol. V., Nos. 118-120. From the Editor.

"Annales de la Société Entomologique de France." 6th Series, Tome II., Parts 1-4, 1882. 7th Series, Tome III., Parts 1-4, 1883. From the Society.

"Zoologischer Anzeiger." VIII. Jahrg. Nos. 196, 197. From the Editor.

"Abhandlungen herausgegeben vom Naturwissenschaftlichen Vereine zu Bremen." Band IX., Heft. II., 1884. From the Society.

"Proceedings of the Royal Society of Queensland." Vol I. Parts 2, 3 and 4., 1884. From the Society.

"Victorian Naturalist." Vol. II., No. 3, 1885. "Annual Report," 1884. From the Field Naturalists' Club of Victoria.

"Transactions and Proceedings of the New Zealand Institute." Vol. XVII., 1884. From the Director.

"Monatliche Mittheilungen des Naturwissenschaftlichen Vereins des Regierungsbezirkes Frankfurt." 3 Jahrg., Nos. 1 and 2, 1885. From the Society.

"Transactions of the Entomological Society of London. Part I., 1885. From the Society.

"Special Record of the Proceedings of the Geographical Society of Australasia in fitting out and starting the Exploratory Expedition to New Guinea." From the Society.

"Bulletin de la Société Royale de Géographie d' Anvers." Tome IX., 5th Fascicule, 1885.

PAPERS READ.

A MONOGRAPH OF THE AUSTRALIAN SPONGES.

By R. von Lendenfeld, Ph.D.

Part V.

THE AULENINÆ.

Plate XXVI. to XXXV.

III. ORDO. CERAOSPONGIÆ. Bronn (1).

SPONGIÆ WITH A SKELETON COMPOSED OF HORNY FIBRE. SILICEOUS SPICULES PRODUCED BY THE SPONGE ITSELF MAY OCCUR IN THE GROUND SUBSTANCE, FLESHSPICULES, BUT NEVER WITHIN THE FIBRES.

I.—SUB-ORDO. MICROCAMERÆ.

CERAOSPONGIÆ WITH SMALL SPHERICAL CILIATED CHAMBERS.

The study of a great many forms has led me to consider the size and shape of the ciliated chambers as a more important characteristic, than the structure of the horny fibre, whether solid or filled with pith. To express the mutual relationship of the horny sponges according to this idea, I divide the Ordo Ceraospongiæ into the two Sub-orders Microcameræ, with small spherical; and Macrocameræ, with large oval ciliated chambers. To the first Sub-order I reckon the Spongidæ, Aplysinidæ and Hircinidæ, and to the second the Spongelidæ and Aplysillidæ.

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(1) *Bronn.* Classen und Ordnungen des Thierreiches, Porifera 1ste Auflage.

11. FAMILIA SPONGIDÆ. F. E. Schulze. (1)

Ciliated chambers small and hemispherical to spherical. Communication of inhalent lacunæ with the chambers by means of numerous pores in the latter. Communication of the exhalent canals and lacunæ with the chambers by means of wide pores or canals. Fibres forming a network. Granular axis of fibres very thin. The main (radial) fibres often contain foreign bodies. Numerous granules are usually present in the gallert around the chambers and render that part of it more or less intransparent.

I. SUB-FAMILIA AULENINÆ. R. v. Lendenfeld. (2)

Spongidæ, the body of which forms a reticulation of fibres or lamellæ of a honeycomb-like structure. The lacunæ in the intervals are either simple or traversed by membranes, but in any case appear as a kind of vestibule, inasmuch as the outer surface of the fibres and lamellæ mentioned above is homologous to the outer surface of other sponges. These lacunæ belong neither to the inhalent nor the exhalent canal system, and both these systems open into them indiscriminately.

The free parts of the surface are often protected by thick layers of sand forming a dermal layer, which in some cases can be pulled off intact (Halme.)

The skeleton consists of very slender and transparent connecting fibres, which are free from foreign bodies, and thick radial fibres with uneven surface, filled with sand, &c.; or there are no such "main" fibres at all, and we find at the joining points of some of the ordinary slender fibres, large grains of sand. (Aulena fig. 21.)

The ciliated chambers are very small and spherical.

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(1) *F. E. Schulze.* Untersuchungen über den Bau und die Entwickelung der Spongien VII., Mittheilung; die Familie der Spongidæ. Zeitschrift für wissenschaftliche Zoologie, Band XXXII., Seite 593.

(2) *Auleninæ.* Name derived from the genus Aulena, Greek root. See below under "Aulena."

The canal system appears very lacunose. The granules in the mesoderm are not numerous or absent. Foreign bodies are never found loose in the ground-substance. (1)

The geographical distribution of the species is a very wide one; they grow in *shallow* water.

Although some of the Dysidea described by Marshall (2), and perhaps also some species of Holopsamma described by Carter (3), may belong to my Auleninæ; I cannot place them there. Marshall's species should I think, be left in the group Dysidea, for which a Sub-family of the *Spongelidæ* might be erected. Carter's descriptions are so short that without re-examination of the type specimens their position in my classification cannot be made out with great certainty, particularly as they are not accompanied by illustrations.

The genera described by these authors (l.c.), which come near to my Sub-family, I shall now criticise :—

Psammascus (4) Marshall, is tube-shaped, and therefore very different.

Dysidea. (5) Marshall, has foreign bodies in all fibres.

Psammoclema. (6) Marshall, has no connecting fibres.

Psammopemma. (7) Marshall, is a mass of sand with "little Protoplasm."

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(1) Both *Marshall* and *Carter* described many sponges with foreign bodies in the ground-substance. I have seen similar forms, but believe that they are more rare than is assumed, as by cutting sections through such sponges which have a thick skin protected by sand, one invariably scatters many sand granules throughout the soft parts where they remain imbedded. In this way the observer may be occasionally deluded.

(2) *W. Marshall.* Ueber Dysideiden und Phoriospongien. Zeitschrift für wissenschaftliche Zoologie. Band XXXV., Seite 92 ff.

(3) *H. J. Carter.* Description of Sponges from the neighbourhood of Port Phillip Heads, South Australia continued. Annales and Magazine of Natural History. Series 5, Vol. 15, p. 211, ff.

(4) *W. Marshall.* Ueber Dysideiden und Phoriospongien. Zeitschrift für wissenschaftliche Zoologie. Band XXXV., Seite 92.

(5) *W. Marshall.* L.c., Seite 98.

(6) *W. Marshall.* L.c., Seite 109.

(7) *W. Marshall.* L.c., Seite 113.

Carter's (1) genus *Holopsamma* is described as being "without fibre," a statement which although I consider it incorrect, I must accept, as there are no figures or descriptions of details; one of the species I believe belongs to this group.

Also, Carter's *Dysidea* (2) cannot be placed in this group, as all the fibres of his species seem to contain foreign bodies

Carter's species *Coscinoderma lanuginosum* from Freemantle, W. A., (3), and from Port Phillip Heads (4), might be comparable to Aulena. But I think it probably identical with a totally different sponge, belonging to my Genus Euspongia of which I possess specimens from Torres Straits, etc.

Among the numerous species described by other well-known authors on Spongiology, there are none which I could refer to this Sub-family, which although doubtlessly belonging to the Spongidæ as described by Schulze (5), still shows so many peculiarities, that a detailed description of the anatomy of some of the species constituting it, will be of interest.

26. GENUS HALME. (6) NOVUM GENUS.

Auleninæ which consist of very thin lamellæ. These are much and irregularly folded, and form a honeycomb-like lacunose structure. Outside the whole structure is enclosed by a lamella, which is perforated by numerous large pores, and consequently has a sieve-like appearance. This external covering lamella is identical in structure with the internal lamellæ, and appears as a continuation of these. The pores of this external lamella lead into the internal system of lacunæ. The development of this lamella is subject to great variations. The pores are either round and small or they are enlarged and become polygonal, Then only narrow strips of tissue remain between them. Finally the pores may attain the size of the lacunæ below, when of course the dermal lamella as such disappears altogether. (Plate XXVI.)

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(1) *H. J. Carter.* Description of Sponges from Port Phillip Heads, South Australia, continued. Annales and Magazine of Natural History. Series 5, Vol. XV., p. 211.

(2) *H. J. Carter.* L.c., p. 215.

(3) *H. J. Carter.* Contributions to our Knowledge of the Spongida. Annales and Magazine of Natural History. Series 5, Vol. XII., p. 309.

(4) *H. J. Carter.* Descriptions of Sponges from Port Phillip Heads, South Australia, continued. Annales and Magazine of Natural History. Series 5, Vol. XV., p. 318.

(5) *F. E. Schulze* Untersuchungen über den Bau und die Entwickelung der Spongien. VII., te Mittheilung. Die Familie der Spongidæ. Zeitschrift für wissenschaftliche Zoologie. Band XXX., Seite 593.

(6) Halme; from ἅλμη. The dirt which the sea-waters leaves behind on drying. (Od.)

The forms of the species Halme Nidus Vesparum, globosa, and micropora possess a more or less developed dermal membrane of this kind, whilst such a structure was never observed in any specimen of Halme simplex.

The shape of the Halme specimens is very variable. Massive forms and such with finger-shaped processes appear to be the most frequent ones. Halme simplex is always expanded, flat and incrusting.

In the surface both of the covering lamella and also of the lamellæ in the interior, we meet with numerous small inhalent pores of elliptic shape, which are covered by a sieve-membrane. These lead into short and wide cylindrical inhalent canals, which open into the common subdermal cavity. Irregular and short pillars of tissue traverse the cavity and unite the skin with the inner part of the body. There is no Pseudosculum, Halme is a true Auloplegma.

The subdermal cavity is low. From its inner surface inhalent canals of irregular transverse section originate which branch in a more or less penicillate manner. All these canals seem to tend upwards. The final ramifications of the inhalent system are regular, cylindrical canals with a circular transverse section. These canals are comparatively very wide, as even the smallest have a diameter greatly exceeding that of the membranes of tissue which separate the two canal sytems.

The exhalent canals are wider than the inhalent ones. They commence with sack-shaped cylindrical branches, uniting likewise in a penicillate fashion to form the larger exhalent stems. The canals become more and more irregular the larger they get, and finally appear as irregular and wide lacunæ. The osculum is much smaller than the lacunose oscular tube, and more or less circular. The oscula are scattered irregularly all over the surface of the lamellæ.

The Halme species differ from other sponges very much in consequence of the great width of their canals, and the exceptional thinness of the dividing membranes.

The thickness of these dividing membranes is pretty uniform 0·016 mm.

In these membranes which devide the inhalent from the exhalent system we find the ciliated chambers forming one continuous, uninterrupted, dense layer. The chambers are spherical, the inhalent pores numerous and small. Each chamber possesses one circular exhalent pore, which opens into the side of an exhalent canal without a special canal. The chambers take up the whole of the thickness of the dividing membranes and have accordingly a diameter of 0·016 mm. The ground-substance is transparent and does not contain any granules. It shows in other respects the ordinary appearance of the Mesoderm of the Spongidæ. The skeleton consists of a network of horny fibre and a dense dermal layer of sand. The sand in the outer, exposed surface is very coarse and forms a thick and hard armour, which is perforated by the pore-canals. On close examination it appears that these sand-granules are attached to one another by a kind of cement, which in its optic appearance and chemical structure (susceptability to staining re-agents) shows no difference from the Spongiolin of the horny fibres. I do not doubt, that the sand-granules are actually attached to one another by Spongiolin.

On all surfaces of the internal lamellæ we find a similar armour, but this is not near so thick and consists of very much finer sand. Spongiolin-cement cannot be demonstrated here.

The fibre-skeleton rises from a basal horn-plate containing much sand. Radial main, and tangental connecting fibres are very well defined.

The main fibres ramify in a penicillate manner, copying in this respect the Canals. All the ascending branches assume the same direction further on and so appear parallel in the distal portions.

These fibres are completely filled with coarse sand and appear as sand fibres which are enclosed by a thin horny layer only. These fibres consequently have a very uneven, knobby surface; because the outer horny layer is so thin, that it is not sufficient to fill the depressions between the adjacent projecting corners of the sand-grains. The covering horny layer shows a very marked stratification, consisting of different layers of horny substance with different refracting powers. These main fibres are on an average 0·3 mm., thick and 1·5—2·5 mm., distant from one another.

The connecting fibres are free from foreign bodies and very much thinner. They attain about one tenth of the thickness of the main fibres. They are generally vertical on the main fibres, straight and unbranched. Sometimes it appears as if one of these fibres had several distinct roots, connecting it with the main fibre. It also may happen that two adjacent fibres coalesce half-way between the main fibres for a short distance. Only in this way do some of these fibres appear slightly ramified. The average distance of these fibres from one another is equal to the thickness of the main fibres.

The genus is found throughout the Australian region.

59 SPECIES.

HALME NIDUS VESPARUM, NOVA SPECIES.

HOLOPSAMMA LAMINÆ FAVOSA. Carter (1).

PLATES XXVI., XXIX.

SHAPE.

A great many sponges of very varying shape, which I have seen, correspond in their internal structure so closely, that I have combined them to the above species.

According to my idea a great many sponge specimens, which have passed through my hands belong to it.

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(1) *H. J. Carter.* Description of sponges from the neighbourhood of Port Phillip Heads continued. Annuals and Magazine of Natural History, Series 5, Vol. XV., page 212.

The ordinary shape of this species is that of a more or less irregular bulb. (Plate XXVI., fig. 1), on which excrescences are often found, these may attain the digitate shape characteristic of the variety represented in Plate XXVI., fig. 2. Often the bulbous central mass disappears altogether, and the whole sponge consists of a smaller or greater number—up to eight have been observed—of finger-shaped processes of varying length.

The finger-shaped processes are cylindrical, and generally have a very regular, circular transverse section. (Plate XXVII., fig. 5.) Rarely the sponge expands in the shape of a flat lamella attached by a small portion of the lower surface to suitable bodies in the sea.

In outer appearance our sponge represents a species of Echispidæ very frequent in Australian waters, so closely that it is often hard to tell the difference between them without microscopic investigation. It appears to me that this is a case of mimicry. The Echispid Sponge referred to is filled with sharp and dangerous spicules tr. ac., and tr. tr., and it may be of advantage to the more defenceless Halme Nidus Vesparum to imitate this better protected sponge in external appearances to escape being attacked by some rapacious animal.

SIZE.

The largest bulbous specimens attain a diameter of 60 mm.

The finger-shaped processes of the other variety are generally about 12-18 mm. thick, and attain a length of 70-120 mm.

The largest specimens I have seen belong to the digitate variety.

COLOR.

The sponge is gray with a slight violet tinge when alive. This tinge vanishes as soon as the sponge dies, and is probably caused by a fluorescence in the outer cells in a similar way as the beautiful carmoisin red of the live Aplysilla violacea. (1)

In spirits and dry, this sponge is gray, it has in fact the color of the sand which forms the greater portion of its cortex.

Color varieties have not been observed by me.

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(1) *R. v. Lendenfeld.* Ueber Coelenteraten der Südsee, Zweite Mittheilung. Neue Aplysinidæ, Zeitschrift für wissenschaftliche Zoologie. Band XXXVIII., Seite 238.

SURFACE.

As mentioned above in the diagnosis of the genus, the surface is liable to very great variations according to the development of the dermal lamella.

The whole sponge consists of a hornycomb-like reticulation of lamellæ, (Plate XXVII., fig. 4), which is enclosed by a dermal lamella. This latter is the only portion of the sponge visible from without. This lamella is perforated by numerous pores. The appearance of the surface depends on the distribution, shape and size of these pores. They cannot be enlarged or constricted by the sponge. In some specimens these pores are round, circular, on an average 2 mm. wide and 3-4 mm. apart, as in the specimen represented in Plate XXVI., fig. 1. Exceptionally these pores may be still smaller and further apart, as it is sometimes found particularly in the basal portion of the sponge. Generally however, the pores are larger and then they become polygonal, being so close together that there would be no room for them if they were round. A specimen with pores of this kind is represented in Plate XXVI., fig. 2. Here the pores measure 3-4 mm. across, and the tissue between them is only 1 mm. wide. Rarely the pores are still larger, and then of course the dermal lamella disappears altogether, as such. Then the pores are as large as the cavities in the honeycomb structure of the interior of the sponge. (Plate XXVII., fig. 5.)

There seems to be no correlation whatever between the shape of the sponge and the development of this dermal lamella with its pores.

These pores are neither inhalent nor exhalent. They are indifferent.

VESTIBULE.

The most interesting peculiarity of our sponge, to which I have already alluded above, is its structure. This is always the same, however much the shape and surface of the specimen may change.

The whole sponge is like a honey-comb covered by a beehive perforated with numerous pores. These pores, which have been described above, are in direct communtion with the spaces beneath; they lead into them from without.

These large lacunæ in the interior are also in communication with one another by so large apertures in the dividing lamellæ that they must be considered as continuous. (Plate XXVII., figs. 4, 5.) The lamellæ between these pores are the true body of the sponge, they are irregularly bent and twisted, and on an average 1 mm. thick. This system of lacunæ connected with the outer seawater by numerous large pores is a structure different to anything hitherto known in sponges. All these lacunæ together can be very correctly designated as a vestibule or anti-chamber, and the name of the subfamily is derived from this peculiarity. Into these lacunææ the oscula open, and from them also the inhalent canals originate.

If we were to imagine an ordinary sponge to grow in very thin lamellæ, that these lamellæ coalesce in parts and form a honeycomb structure as in the beautiful and large Echispid mentioned above and that further from the free margins of the lamellæ a dermal membrane were to grow out, which surrounded each opening with a fringe of varying development; we would have a sponge before us which in this respect would be like Halme.

That, as here stated, these lacunæ do not belong either to the inhalent or exhalent system is conclusively proved by the fact, that in the surface of the lamellæ between them, both inhalent and exhalent pores are found.

THE SIGNIFICANCE OF THE VESTIBULE TO THE SPONGE.

It is perhaps difficult to see what advantage the sponge may derive from this peculiar structure. We might assume that the *raison d'être* of it is the following :—

1. It is disadvantageous to the sponge to load its outer surface with a hard pavement of cemented sand granules, which pavement of course greatly impedes the movements of the pores, and consequently also the regulation of the water current.

2. It is advantageous to any sponge to be defended by a hard armour of cemented sand on its surface.

The effect of the combined action of these two regulatives during the ordinary course of evolution, might be the peculiar structure just described.

The portion of the sponge exposed to attacks is principally the outer lamella. It is as we shall see below, covered by an immense armour of large sand granules cemented together with Spongiolin. This cortex gives to our sponge a high degree of hardness.

The surface of the interior lamellæ is not covered by such an armour, here we only find small and loose sand granules (Plate XXVII., fig. 7.)

A differentiation in function has taken place between the internal and external portions, they both nevertheless have retained a similar internal structure: both contain the same canal system and ciliated chambers. A difference is only perceptible in the sandy cortex of the two.

It will doubtlessly strike the reader, that these Auleninæ are very similar to certain Asconidæ among the Calcareous sponges, which likewise possess an "Inter-canal system" and numerous "Pseudopores" just like our Auleninæ. I refer as an example to the Auloplegma form of Ascaltis cerebrum (1). I established the term Auleninæ without one thought of the "artificial genus" Auloplegma and only afterwards it occurred to me that Haeckel had used the same root for his name, which shows better than any description; as it were in an intuitive manner, how very similar these structures must be.

It appears to me very likely that the Auleninæ are not developed from ordinary sponges in the manner indicated above, and that moreover they represent among the Ceraospongiæ a group similar to the above mentioned Asconidæ among the Calcispongiæ.

This is the reason why I place these Auleninæ at the beginning of this Order.

The disadvantages connected with this arrangement are very apparent. The water may pass through the canal system of the sponge proper more than once, which of course is a bad thing unless there be such arrangements in the distribution of inhalent pores and Oscula throughout the suface of the lamellæ to prevent the water which has once been expelled through an Osculum from being inhaled again.

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(1) *E. Haeckel.* Das System der Kalkschwämme. Band III., Tafel 8, fig. 6.

As far as my own observations extend, I can only say that I have not seen anything of the kind. It appears to me that pores and Oscula are scattered over the surface of the lamellæ in a perfectly irregular manner.

These sponges represent aberrant forms which may perhaps have retained some peculiarities of intermediate stages between the hypothetical simple gastrula-like ancestors, and the present horny-sponges.

This appears particularly likely if we adopt F. E. Schulze's (1) hypothesis regarding the embryological development of the present highly complicated horny-sponges by a continued process of folding or plication, as an image of the phylogenetic development of horny-sponges. In any case our Aulena sponges are very interesting, and the study of their development may lead to very important results.

CANAL SYSTEM.

All over the surface of the sponge lamellæ; both where it is exposed to the outer world, as also, where it forms the limit of the lacunæ described above, inhalent pores are met with.

These pores have been referred to in the diagnosis of the genus above; they are oval and measure 0·025 x 0·035 mm. across. They are covered in the usual manner by a very thin and transparent sieve membrane. There seem generally to be 10-15 pores in this membrane. These can evidently be enlarged or constricted by the sponge, and generally appear oval like the pore itself. (Plate XXVII., fig. 9.)

Spirit specimens never show these pores distinctly, but I do not think that they can be entirely closed. I once had occasion to keep a specimen a few days in a natural aquarium. By squirting strong osmic acid on to its surface without removing it from the seawater, in the manner described in my paper on Australian Aplysinidæ (1), I obtained the specimen figured, and I think that the pores in the sieve-membrane will never be much more dilated than there.

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(1) *F. E. Schulze.* Untersuchungen Ueber den Bau und die Entwickelung der Spongien, IX., Mittheilung Die Plakiniden. Zeitschrift für wissenschaftliche Zoologie. Band XXXIV., Seite 438.

The pores in the interior are of course not surrounded by such large sand-granules as those in the outer surface, one of which is represented in the figure (Plate XXVII., fig. 9.)

Below the sieve-membrane we find a short cylindrical canal leading into the sub-dermal cavity (Plate XXVII., fig. 7, Plate XXIX., fig. 12.)

As mentioned above, these canals are liable to movements in the interior; where the skin is soft; but they do not change in the outer surface, where they are surrounded by a hard immovable cortex. Consequently we find shape and size of these canals subject to great variations in the interior where they are sometimes very much constricted and then appear very narrow, whereas those in the outer surface are always of the same size.

The cortex being much thicker outside than internally, we find these canals also much longer where they traverse the outer cortex than anywhere else.

Below, these canals expand conically and open into the common sub-dermal cavity which undermines the whole of the surface.

The flat lacunæ, which, tangentally extended and underlying the outer skin form the sub-dermal cavity are interrupted here and there by low columns of tissue connecting the skin with the body. The cavity itself is very irregular (Plate XXIX., fig. 12) and from its lower limit numerous inhalent canals originate with trumpet-shaped extensions, which mostly tend upwards (Plate XXIX., fig. 12).

These canals are rather irregular, more or less cylindrical, and measure 0·06-01. mm. in diameter.

They are mostly simple as in Aplysilla. Ramifications are only rarely met with. Where they do occur the ramification is penicillate. The inhalent canals, whether ramifying or not, always taper slightly centripetally and become very regularly cylindrical towards the blind end. These canals are nearly straight and attain a length of 1—2 mm.

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(1) *R. von Lendenfeld.* Ueber Cœlenteraten der Südsee. II. Mittheilung Neue Aplysinidæ, Zeitschrift für wissenschaftliche Zoologie. Band XXXVIII.

As mentioned above, the sponge-tissue, which divides the system of these inhalent canals from the exhalent ones, is but a very thin membrane, measuring only 0·016 mm. on an average in diameter; except where a main fibre intervenes. (Plate XXVII., fig. 7, *H.*) Divided from the parallel and straight inhalent canals by this membrane we find the exhalent canals, which are wider, measuring on an average 0·12 mm. in diameter, cylindrical and likewise, mostly straight and tending upward. These are oval or circular in transverse section. (1). (Plate XXVII., fig. 7, *e.*) Small canals, as some in this figure, are rare.

The exhalent canals unite in a penicillate manner, they are slightly more ramified than the inhalents, and finally open into a large and irregular central cavity, the oscular tube. (Plate XXVII., fig. 7, *A*; Plate XXIX., fig. 12, *O.*) Also this, like all the other canals, tends upwards and generally measures about 0·4 x 1·5 mm. in diameter, on an average it attains a length of 2—3 mm. The osculum is circular, and measures about 0·3 mm. in diameter, so that the oscular tube appears constricted at its termination. No oscula are found on the external surface. The osculum lies at the same level as the surface around, it is not raised above it.

The ciliated chambers (Plate XXVIII., fig. 11., Plate XXIX., fig. 13), fill the whole of the membrane between the canal systems as described above in the genus diagnosis. They form one continuous, dense and uninterrupted layer. Filling the whole thickness of it, they measure 0·016 in diameter, and are accordingly quite exceptionally small. They are perfectly spherical.

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(1) On the section these canals appear oval, but I think that this is due to shrinking and pressure during the complicated method of hardening, &c. I believe that in life the whole structure must be more loose, and all cavities more rounded and larger than in hardened specimens.

Numerous small pores lead from the inhalent canal into the side opposite the circular and comparatively very small exhalent pore or Chamber Osculum. Vosmaer (1), in his diagnosis of the Family Spongidæ states that their chambers are semi-sperical. This is certainly not the case here, and I take this opportunity to mention that also in several other Australian genera, which, without doubt belong to the Spongidæ as conceived by Vosmaer (l.c.), F. E. Schulze (2) and myself (3); the chambers form in a similar way much more than *half* a sphere.

The narrow pores appear very variable in size and number, and I do not doubt that they can be formed in any part of the aboral portion of the ciliated chamber constricted and closed at the option of the sponge.

The Chamber Osculum (Plate XXIX., fig. 13 *O*), appeared to me to be clothed by a peculiar flat epithelium. But with such small and delicate structures the observations are of course not very reliable. In the figure (Plate XXIX., fig. 13), I have represented this as it appeared to me. In the Aplysillidæ, I have found a different arrangement (4), which has also been seen by Vosmaer (5.) Whilst here in Halme, the ciliated cylindrical collar-cell epithelium terminates abruptly, and there is no transition between the high cylindrical elements of the chamber and the flat-cells of the canal epithelium; we find in the cases referred to (Aplysilla, etc.), cells around the inner margin of the Chamber

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(1) *G. C. Vosmaer.* Studies on Sponges. I. On Velinæ Gracilis. N. g., n. sp. Mittheilungen aus der Zoologischen Station in Neapel. Band IV., Seite 445.

(2) *F. E. Schulze.* Untersuchungen Ueber den Bau und die Entwickelung der Spongien, VII., Mittheilung. Zeitschrift für wissenschaftliche Zoologie. Band XXXII., Seite 593.

(3) *R. v. Lendenfeld.* A Monograph of Australian Sponges. Part II. Proceedings of the Linnean Society of N.S.W., Vol. IX., p. 340.

(4) *R. v. Lendenfeld.* Ueber Cœlenteraten der Südsee, II., Mittheilung Neue Aplysinidæ, Zeitschrift für wissenschaftliche Zoologie. Band XXXVIII., Seite 260.

(5) *G. C. Vosmaer.* Bronn, Classen, und Ordnungen des Thierreiches. Porifera. Seite 182.

Osculum, which are cylindrical, but do not possess a collar, and which in every respect present transition forms between the chamber epithelium, and the canal epithelium.

SKELETON.

The skeleton of the Halme Nidus Vesparum specimens observed by me is always the same however different the sponge may appear in shape and size.

Main fibres and connecting fibres are, as stated above. in the description of the genus, very different from each other.

The main fibres grow up from a basal horny plate containing much sand and tend upwards remaining in or near the centre of the sponge lamellæ. They finally curve slightly outward and ramify in a penicillate manner. The branches are as thick as the stems and in their terminal portions more or less parallel.

Comparing our sponge with others we notice that the ramification of these main fibres is but slight and that the *main fibres never hardly seem to coalesce to form a reticulation.*

The main fibres are on an average 0·3 mm., thick. The greater portion of them, the whole inner part (Plate XXVIII., fig. 8, Plate XXVII., fig. 7) is taken up by a dense mass of large sand granules held together by a Spongiolin-cement. Outside we find a thin horny layer on the surface of the sand. This is stratified and the layers are visible because the successive strata refract the light in a different degree.

This outer coating or sheath is very thin, measuring only 0·01 mm., in thickness. Consequently the surface or outline of the fibre appears very uneven as the projecting corners of the imbedded sand grains are divided by indentures, which the outer horny layer is not thick enough to fill up.

These main fibres are connected with one another by connecting fibres (Plate XXVII., fig. 8). These are very simple and as shown in the figure mostly straight, vertical to the main fibres and only very slightly ramified.

The ramifications never lead to the production of a network; only occasionally we see adjacent fibres coalescing in the middle or also a fibre divided into 2, 3 or more little branches which appear as its roots on one side.

These fibres have a thickness of about 0·02 mm. They are very light in color somewhat like glass and perfectly transparent With a high power of the microscope a very slender axial thread is made apparent, which swells to little conic granular masses at the points where the axial thread joins the main fibre.

These fibres are about 0·3 mm. apart from one another.

Also the cortex of the sponge must be considered as an integral part of the skeleton, and this all the more as we find the main fibres actually coalescing with it. (Plate XXVII., fig. 7.)

The structure of the cortex is very interesting. Some theoretical conclusions from its peculiarities have been drawn above. The sand granules forming the cortex on the outer exposed surface measure on an average 0·1 mm. in diameter, and what is very remarkable, are all of the same size.

The sand granules in the interior of the main fibres are identical in size and shape with those in the outer exposed surface, and without a doubt derived therefrom. (1) These sand granules are held together by a cement of spongiolin, and the armor they form has a thickness of about 0·35 mm.—a thickness very similar to that of the main fibres.

The canals leading into the vestibule-lacunæ are short and circular, cylindrical perforations of the external lamella. (Plate XXVII., figs. 4, 7; *O.*)

In the wall of these short tubes we find a very different kind of cortex. It is a transition from the cortex without to the cortex within. Near the outer surface (compare the figure) the sand grains are as large as in the outer cortex, but the layer they form is only about half as thick.

As we proceeded downward the size of the sand grains and also the thickness of the sand layer decrease rapidly, until finally we find in the lower proximal portion of this canal, sand grains, which measure only 0·02 mm. or less on an average. (Plate XXXVII., fig. 7; *f*.) The thickness of the layer they form is only 0·5—0 7 mm. or less. A similar layer of similar sand grains is found throughout the interior surfaces of the sponge.

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(1) This is in accordance with the views expressed by Carter and others.

GROWTH OF THE SKELETON.

Whether a selection in the sand grains, which came in contact with the sponge, by the latter, is executed in such a way as to retain the large grains on the outer surface and the small ones in the interior, cannot be ascertained, but there can be no doubt, that also without such an act on the part of the sponge the disparity in size of these elements of its cortex can be partly explained without difficulty in the sense of F. E. Schulze. (1) The large sand granules never enter the pores in the outer lamella because there is not sufficient current in the interior of the sponge to carry them along. The small ones are carried along also with the weak current in the interior, and they are then retained on the interior surfaces.

The fact however that *no small sand grains are found in the outer surface* cannot be accounted for in this way. There we must assume that the sponge exerts some voluntary selection.

As the sponge grows, the outer surface with the large grained cortex is moved more and more from the basis of the sponge and the main fibres grow after it always remaining in contact with it they derive as it were the sand we afterwards find in them from the cortex.

We can conclude from this, that the *region where the sponge grows is just below the surface.*

The connecting fibres grow out from the main fibres as room for them occurs below the receding outer cortex.

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(1) *F. E. Schulze.* Untersuchungen Ueber den Bau und die Entwickelung der Spongien. Die Gattung Spongelia. Zeitschrift für wissenschaftliche Zoologie. Band XXXIII., Seite 131.

HISTOLOGY.

I have not observed any thing peculiar in the structure of this sponge. It is remarkable, that *no granules* are found in the ground substance around the ciliated chambers. It is known to the reader, that the family of the Spongidæ has been defined as comprising species with such granules by F. E. Schulze (1) a definition accepted by us afterwards without alteration. If I now place these sponges in this family; I do so in consequence of a desire on my part not to complicate the classificatory system too much; and not because I think that the presence or absence of granules is a thing of little importance. I must however say that I examined several, as yet undescribed species of horny sponges which I intend to describe as Spongidæ, which likewise possess a comparatively clear ground substance.

The tenacity with which such peculiarities adhere to certain forms —the "systematic value" of them—can as yet not be ascertained because we know so very little about all these sponges.

I have found both male and female sexual products in the specimens I have examined but I cannot say whether the species is hermophroditic or not. I have never found male and female sexual cells side by side, but this of course is an observation of no value to decide this question.

PARASITIC ALGÆ IN THE SKIN.

In the outer skin between the hard sandy cortex and the outer surface generally, small algæ are met with, which have the shape of fine threads consisting of a string of cells. (Plate XXVIII., fig. 10.) These threads are rounded on each end.

It is connected with difficulty to find these structures, because they are of a very faint brown color and very small. I have however, been able to find them in most specimens, and I cannot say whether they do not occur also in those where I have not seen them. I no not think that they can be of much importance to the sponge in which they live; they are certainly very similar to those Oscillarians of which I assume that they are the cause of the formation of the filaments in the Hircinidæ. (1) The family of the Hircinidæ is a doubtful one, and before the true nature of the filaments is known, we will hardly be able to arrive at any satisfactory conclusions concerning them. I do not place very much reliance in the conclusions which might be inferred from Poléjaeff's (2) observations on the subject. I on the contrary, uphold my hypothesis referred to above, as the most likely one.

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(1) *F. E. Schulze.* Untersuchungen Ueber den Bau und die Entwickelung der Spongien Die Familie der Spongidæ. Zeitschrift für wissenschaftliche Zoologie. Band XXXII.

True filaments or anything like them, have not been observed by me in theHalme specimens I examined, so that I would not consider myself justified in placing this genus in the Family Hircinidæ, even if the oscillaria I found in Halme were identical with the one, which according to my idea causes the formation of filaments in the Hircinidæ.

GEOGRAPHICAL DISTRIBUTION.

Eastern Coast of Australia, Southern Coast of Australia, Port Phillip (Von Lendenfeld); Port Jackson (Ramsay, Von Lendenfeld); Port Stephens (Ramsay).

BATHYMETRICAL DISTRIBUTION.

5-20 metres. (Port Phillip and Port Jackson.)

The bulbous variety has been obtained from the three localities. The digitate variety has been obtained from Port Stephens only.

60. SPECIES.

HALME SIMPLEX, NOVA SPECIES.

PLATES XXVI., XXVII.

As the structure of this species is similar with that of the foregoing it will be sufficient to give a short diagnosis of it here.

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(1) *R. v. Lendenfeld.* Notes on the Fibres of certain Australian Hircinidæ. Proceedings of the Linnean Society of N.S.W., Vol IX., p. 641,

(2) *N. Poléjaeff.* Report on the Keratosa. The Zoology of the Voyage of H.M.S. Challenger. Part XXXI., p. 12.

SHAPE AND SIZE.

Halme simplex is a low, incrusting sponge. The crusts are higher in the centre than at the margin and of irregular roundish outline. The regularity of the outline is often disturbed and then we find lobate extensions of varying shape and size. The crust has a thickness of 12-20 mm., and may extend to 100 mm. (the largest specimen seen by me).

COLOR.

The sponge is generally, alive and also when dry, of a uniform dark chesnut color. I have however seen some dried, badly preserved specimens of it, which were grey.

STRUCTURE.

Thesponge consists of lamellœ which are not nearly so complicated in their plications as those of the foregoing species. The honeycomb structure (Plate XXVI., fig. 3) is more simple than in Halme nidus vesparum. The whole of the lamella appears as a portion of an irregular comb. The surfaces are curved in one direction (laterally) only, whereas they are straight in the other direction (vertically). From a basal incrusting lamella numerous upright and much curved septa or lamellæ arise between which there are large conic spaces (Plate XXVII., fig. 6). These lamellæ correspond to the *interior* lamellæ of the foregoing species. The conic spaces between them are the vestibule lacunæ. An external lamella as described above is not met with; the conic lacunæ are in open communication with the sea-water outside.

The skeleton is similar to that of Halme Nidus Vesparum and a cortical layer of sand grains is met with. This latter consists of a thick layer of large grains on the free margins of the lamellæ and of a thin layer of small grains further down in the surface near the bottom of the conic spaces. Half way up we find a cortex intermediate between the two.

It appeared to me that the skeleton in general was more coarse than in the other species, microscopic measurements, however, proved that it was not so. The sponge is not nearly so hard as Halme Nidus Vesparum. There is a great abundance of sand, but it appears that the Spongialin-cement is not so highly developed in this species as in the foregoing.

GEOGRAPHICAL DISTRIBUTION.

North Coast of Australia, South Coast of Australia, Mauritius, Port Phillip (Von Lendenfeld); Torres Straits (Macleay); Northern Territory of South Australia (Haacke); Mauritius (Von Haast).

BATHYMETRICAL DISTRIBUTION.

10-20 metres. (Port Phillip.)

The Port Phillip specimens are black when dry (brown in spirits and living). All the others light or dark brown (dry).

61. SPECIES.

HALME GLOBOSA, NOVA SPECIES.

SHAPE AND SIZE.

The specimens which I refer to this species are bulbous, more or less spherical and attached by a small portion of the surface only. They measure from 30 to 60 mm. in diameter.

COLOUR.

In the living state this sponge has a greyish-purple color, which seems however, to be subject to unusual variations. The purple is always the same, but the grey varies according to the nature of the foreign bodies in the dermal lamella, from light to dark gray. In spirits, it preserved well, the sponge retains its dull purple color; if not well preserved, and when dry the sponge is brownish grey.

SURFACE.

The Dermal Lamella is developed in a rather different manner than in Halme Nidus Vesparum. It appears as a terminal thickening of the distal interior lamella. On sections it makes the impression of a wedge-shaped thickening. The contour of the

Pseudopores is also not so sharp as in Halme Nidus Vesparum, but more rounded. The Pseudopores themselves consequently appear from without as trumpet-shaped openings narrowing towards the interior. They measure on the surface 8 mm., and in the narrowest part a little below 5 mm. across. They are more or less circular and divided from one another by bridges about 7 mm. wide.

STRUCTURE.

In its structure our species represents a marked peculiarity in one respect only. We usually find that the wide inhalent canals, which are simple open tubes in the two foregoing species, are here pervaded by numerous fine membranes, similar in structure to those which pervade the vestibule space in the genus Aulena. These contain a great number of wandering amœboid cells, which are highly colorable and present in sections a very remarkable appearance, after Alum-Carmin staining. I believe that here in the inhalent canals we may perhaps look for the digestive operations of this sponge. It seems that the digestive functions are performed *by different parts of the inhalent system in different sponges.* I believe also to have seen in these perforated diaphragm-membranes, cells which might be considered as sensitive and ganglia cells.

GEOGRAPHICAL DISTRIBUTION.

South Coast of Australia, Port Phillip (Von Lendenfeld); St. Vincent's Gulf (Haacke).

BATHYMETRICAL DISTRIBUTION.

In shallow water.

The St. Vincent Gulf specimens are larger than those from Port Phillip.

62 SPECIES.

HALME MICROPORA, NOVA SPECIES.

SHAPE AND SIZE.

This species is irregular globose with deep, rounded indentures, which divide it into lobes of varying shape and extension. Only two specimens have been seen by me, both are of equal size, measuring 40 mm. in height, and 70 mm. in breadth.

COLOR.

This species I have only seen in the dry state. Then it is of a bright yellow, light ochre-coloured.

SURFACE.

The surface is different from that of any of the foregoing species. The dermal lamella namely, is very thin and does not contain so hard and resisting an armour of cemented sand-grains as in Halme Nidus Vesparum, which species is the most like it as far as the surface-structure is concerned. Between the terminations of the interior honeycomb, which is exceptionally regular, the dermal lamella is in the dry specimens depressed. It appears as if it had collapsed. In the centre of each depression there is a small round Pseudopore. These pores measure only 1 mm. in diameter, are all of uniform width, and about 10 mm. apart, scattered very regularly over the surface.

STRUCTURE.

The internal structure is peculiar. The honeycomb structure is more marked than in any other species. On a section one perceives that the walls of the cells are straight and upright as in Halme simplex. But there are several layers of such cells, one over the other, the cells of different layers communicating with one another by small pores only. As no spirit specimens have been examined by me, the position of this sponge appears somewhat doubtful; the general appearance however, is so similar to the other species, that I consider myself justified in placing this sponge in the genus Halme. It might however, be one of the Spongelidæ.

GEOGRAPHICAL DISTRIBUTION.

East Coast of Australia, Illawarra (Ramsay).

BATHYMETRICAL DISTRIBUTION.

Both specimens were washed up on the beach near Wollongong.

27. GENUS APHRODITE. (1) NOVUM GENUS.

Auleninæ of Nardorus shape without secundary diaphragm lamellæ in the vestibule-space with a terminal Pseudosculum. Small conuli scattered all over the surface. No dermal lamella developed. The skeleton consists of radiating main fibres charged with foreign bodies and tangental connecting fibres, which have an eighth of the diameter of the main fibres, and are destitute of foreign bodies.

63. SPECIES.

APHRODITE NARDORUS, NOVA SPECIES.

Shape and Size.

The only specimen of this sponge seen by me is pyriform and pedunculate.

It reaches a height of 150 mm. The peduncle is cylindrical and circular on transverse section, perfectly straight and upright, of uniform thickness throughout, and 80 mm. long. It measures 9 mm. in thickness. On the summit of it the sponge expands in the shape of a sphere to a width of 30 mm., and tapers towards the upper end, which is crowned by the large, circular pseudosculum, which measures 9 mm. in diameter. (Plate XXXV., fig. 34.)

It represents to a great extent the figure given by Haeckel (2) of his Ascilla Gracilis Nardorus. Only the network is more dense and the surface conulated.

Color.

In spirits light yellow, greyish in the interior.

Surface.

There is as mentioned above in the diagnosis of the species, no dermal lamella, and so the interior structure is open to view from without. The Pseudopores are very irregular, elongate, pointed at each end and longitudinally disposed. All the exposed surfaces are uniformly conulated. The conuli are about 1 mm. high, and 2 mm. apart from one another. At the bottom of the peduncle the conuli are nearer to one another than further up. There is no difference in the conulation of the peduncle and head.

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(1) Aphrodite=᾽Αρϛοδίτη. The Ideal of Beauty arisen from the waves.

(2) *E. Haeckel.* Die Kalkschwämme; eine Monografie, Band 3. Tafel 6, fig. 5.

STRUCTURE.

With the exception of the dermal lamella, the microscopic structure is very similar to that of Halme Nidus Vesparum described above. In other respects this sponge shows greater affinities to Aulena. The true body of the sponge consists of a network of thick, cylindrical, longitudinally disposed fibres which coalesce very frequently. They measure 5-8 mm. in diameter, and form a dense network supported by the peduncle. Throughout these, as also in the peduncle we meet with a canal system and skeleton similar to that of Halme Nidus Vesparum. The inhalent pores are found abundantly on the exposed parts, whereas the Oscula are all directed inward towards the Pseudogaster. At the top of the peduncle there are several larger Oscula. There are no Oscula on the sides of the peduncle. Evidently here the Pseudogaster is being converted into a true Oscular tube, and if the apertures between the fibres of the true sponge body were filled up we would have a sponge before us with a simple terminal Osculum. The thinking reader can draw his own conclusions from these statements. It may, however, be of interest here to mention the variety in shape in a sponge which I have named Cacospongia exemplum. Over a hundred specimens of this sponge have passed through my hands, There are numerous varieties, but all are connected with one another in such a manner by intermediate forms that they altogether represent a continuous series, special forms of which have been described by Hyatt and Carter from Australian waters. In the first variety C. ex. prima, we have flat, expanded frondose forms. All the Oscula are on one side. In the second, (C. ex. secunda) we have a true cup formed by the bending and final coalescing of the lateral margins of this plate. All Oscula are on the inner side. Geelongia Vasiformis, Carter, is identical with this variety. Further the cup becomes smaller and smaller until a pedunculate pyriform sponge with numerous Oscula on the apex is produced. (C. ex. tertia.) This variety is identical with some sponges described by Carter as Stelosponges levis, Hyatt, etc., and also with Hyatt's Spongelia rectilinea errecta. Finally in quart. (C. ex. terminus) we find a pedunculate pyriform sponge with a single terminal Osculum. This shows how in various ways the same form may finally be produced, and with what difficulties the study of the relationship of sponges is beset, at the same time furnishing an example to Oscar Schmidt's statements regarding approximating development.

GEOGRAPHICAL DISTRIBUTION.

North Coast of Australia, Torres Straits, Palm Tree Island (Macleay.)

BATHYMETRICAL DISTRIBUTION.

Shallow water.

28. GENUS AULENA. (1) NOVUM GENUS.

Auleninæ, the body of which possesses the shape of a sponge-like reticulation. In the intervals between the meshes of this network a network of very fine membranes expands. The fibres of the sponge network possess the usual structure of sponges. The lacunose cavities between, which are pervaded by the membranes mentioned above, have the significance of anti-chambers. They are attached as it were to the outer surface of the true body of the sponge, and so form a vestibule.

The skeleton consists of a network of very fine horny fibres which never contain foreign bodies, are solid and transparent; and show a slender axial thread and stratified horn substance around it.

In the vestibule portion of the sponge the meshes of the network of these fibres are very wide. In the true body of the sponge about four times as small. In the true body of the sponge we find in most of the places where two fibres join, large granules of sand which exceed in diameter the fibres 5—15 fold. These grains are clothed with a fine coating of spongiolin and form an integral part of the whole skeletal system. (Plate XXXIII.)

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(1) *Aulena* from ἀυλῆ the vestibule or antichamber; with antichambers.

The lacunes between the membranes are connected with one another, and the outer world by numerous large round pores. The distal portions of the true sponge-body extend in the shape of conuli in a radial direction some distance beyond the lacunose tissue. Inhalent pores and oscula occur throughout the whole of the surface of the true sponge-body. Some of these—on the projecting conuli—open direct into the outer water. Most of them, however, open into the system of lacunæ. The inhalent pores are covered with a sieve membrane, they lead into low, tangentally expanded subdermal cavities. The inhalent canals which originate from this subdermal cavity are not very large, much curved and only very slightly branched. The ciliated chambers appear spherical, and are $\frac{1}{3}$—$\frac{1}{2}$ as large as the canals, having a diameter of 0·04 mm. They open with a large circular Chamber Osculum direct, without special canal into the large exhalent canals which unite to form extensive oscular tubes. The oscula are numerous and scattered irregularly over the surface of the sponge. Nardorus and Auloplegma forms.

64 SPECIES.

AULENA VILLOSA. NOVA SPECIES.

(Plates XXX., XXXIV.

At present the only species of the genus.

Shape.

This sponge is comparatively rare. The specimens which I have seen were bulbous without exception; spherical or oval. The sponge is attached to suitable surfaces in the sea by a very small portion of the surface but not pedunculate. It resembles in this respect the massive forms of Chondrosia. The sponge appears to a certain extent radially symmetrical round a vertical axis.

SIZE

The vertical diameter varies from 25—40 mm. Horizontally the sponge generally measures a little less than in height.

COLOR.

The color of the live sponge is yellowish-gray, but seems to be subject to variations. In spirits and dry the sponge appears dirty gray.

SURFACE.

The surface of the sponge is covered by densely situated cylindrical and terminally rounded conuli. (Plate XXX., fig. 14, 15, Plate XXXI., fig. 19, 20.) These conuli are about 2 mm. high, and 0·8 1 mm. broad; they are about 1·4 mm. apart from one another and circular on transverse section. The direction in which these conuli protrude from the surface varies to a certain extent. They invariably radiate from a common centre; but this centre may be situated further up or further down as the case may be. In some specimens this centre coincides with the centre of the sponge; then the conuli stand vertical on the surface. (Plate XXX., fig. 14), in others again, this centre lies near the base of the sponge, and then the conuli all appear to tend upward. (Plate XXX., fig. 15, Plate XXXI., fig. 20.) This makes a great difference to the appearance of the sponge, although it is immaterial. It appears that the locality where the sponge grows has something to do with the direction of the conuli, but as the specimens at my disposal are but few in number I cannot assert this.

These conuli are rather soft and may move with the current of the water. This peculiarity makes the sponge appear villous, and from that the specific name has been taken. The surface of the conuli is soft. Microscopic investigation shows that there are no foreign bodies, sand, or anything of that kind in the outer skin.

The surface in the depressions between the conuli is formed of a very fine soft and tender membrane, perforated by large circular pores which lead into the system of vestibule lacunæ below. The Pseudoscula. when present are few in number, 1-4, circular and on the upper surface they measure 2-5 mm., in diameter.

VESTIBULE.

The great difference between the genera Aulena and Halme, lies not only therein, that in the former the true body of the sponge is formed by lamellæ, and in the latter by cylindrical threads; but particularly also in the great difference in the development of the vestibule in these two.

Whilst in Halme it is a simple empty space between the sponge lamellæ; it is traversed by numerous fine membranes in Aulena. (Plate XXXI., fig. 19, Plate XXXII., fig. 21), which sub-divide it into smaller, more or or less spherical compartments connected with one another by large circular pores in these membranes. It is apparent that by movements of these membranes the current of water can be greatly influenced, and we find that there are nervous and muscular elements contained in them by the united action of which, no doubt the water current is regulated to the advantage of the sponge.

The meshes of the network formed by the true body of the sponge measure, 7-2 mm., and this is the extent of the vestibule lacunæ.

The compartments into which the vestibule space is divided are more or less spherical and measure 0·2-0·5 mm. in diameter.

The whole structure has a froth-like appearance. (Plate XXXI., fig. 19.) This tissue fills the whole of the vacant space between the meshes of the sponge network.

The thickness of the membranes is on an average 0·017 mm. The circular pores (Plate XXXII., fig. 21), are situated in the middle of the fields limited by the lines where the membranes join.

The membranes are supported by horny fibres, which pervade the whole of the lacunose part of the sponge.

THE SIGNIFICANCE OF THE VESTIBULE IN AULENA.

It is apparent that this structure although homologous to the simpler one of Halme, being very differently developed, must perform slightly different physiological function.

The first reason put forward as possible for their formation in Halme cannot hold good here, as there is no cortical lamella to the sponge at all. Also in this genus the resemblance to certain Auloplegma forms of calcareous sponges is very striking.

The whole structure may be a somewhat changed remnant of an organ previously possessed by sponges, and lost in all, except the Auleninæ. In this case we would have to consider Aulena as still more conservative than Halme.

I have however, no knowledge of the embryological development of either genus, so that I must leave it to the thinking reader to draw his own conclusions from the facts described.

CANAL SYSTEM.

The canal system of our sponge is more complicated than that of Halme, but still more simple than in most other sponges.

The inhalent pores are scattered all over the surface and on an average 0·2 mm., apart. They are circular or oval and apparently very liable to changes in shape and size, as their dimensions differ in different specimens and also in different parts of the same specimen. No regularity in these differences could be traced and I therefore believe that they are of the same size throughout the sponge and that they can be contracted and dilated at the option of the sponge.

I estimate the average diameter at 0·04 mm. Outside they are covered by a very fine and tender sieve membrane, with numerous, about twenty, circular pores. I have repeatedly found this sieve membrane absent in spirit specimens, which were preserved by myself and ought to have shown it. Possibly this is due to the extreme tenderness of it. The rapid contracting effect of the alcohol may have ruptured them.

The inhalent pore is the opening of a short, circular and cylindrical canal, about 0·04 mm., long and as wide as the pore itself, which pervades the skin of the sponge and leads into the subdermal cavity.

The latter is not so highly developed as in Halme and consists of a system of wide anastomosing canals extending tangentally and undermining the skin (Plate XXXII., fig. 21). The canals are depressed radially. The outer side is flat and forms a plane parallel to the outer surface. Below the outline of these canals is very irregular, forming wide, conic or trumpet shaped extensions which lead into the inhalent canals. The average width of this subdermal cavity is only 0·03 mm.

The inhalent canals are much curved and only slightly ramified. Their transverse section is generally more or less circular and their diameter averages about 0·18 mm.

They are accordingly very much wider than the subdermal cavity. The ramifications are irregular. Divided from the system of inhalent canals by a lamella, 0·045—0·05 mm. in thickness, we find the exhalent canals. These are much more irregular in shape than the inhalent ones (compare the figure), and of similar average width. Also these are only slightly and irregularly ramified and unite to form irregular lacunose cavities, the oscular tubes. (Plate XXXII., fig. 21.) The average diameter of these spaces is 0·6—0·8 mm. Towards the circular oscula, which are not raised above the surface and scattered irregularly all over the sponge, the cavities are constricted. The diameter of the osculum is 0·12 mm.

The ciliated chambers are spherical and very similar to those described above of Halme Nidus Vesparum. They form like those of Halme a dense layer taking up the whole of the thickness of the lamellæ which divide the inhalent from the exhalent canals. They are accordingly much larger than those of Halme, measuring 0·04 mm. in diameter.

SKELETON.

As the reader will have seen from the description of the genus the skeleton of this sponge is very remarkable. (Plate XXXIII., fig. 22.) The whole skeleton consists of a regular network of solid horny fibres which do not contain any foreign bodies. Main and connecting fibres cannot be distinguished. They are all alike as in Carter's (1) genus Coscinoderma, recently also described by Poléjaeff. (2)

The fibres are circular and cylindrical, and they have a diameter of 0·02 mm. The regular network formed by them is pretty loose. In the true body of the sponge itself the meshes average 0.2 mm. and in the vestibule tissue 0·5 mm.

At the joining points of the fibres, in the true body of the sponge only, we find sandy granules of uniform size, *one in each joining point.* (Plate XXXII., fig. 21, Plate XXXIII., fig. 22.) These measure 0·14 mm. in diameter on a average and are of a more or less spherical shape. Elongate sand grains seem never to occur.

These sand grains, which form, as it will be seen from the above, an integral part of the whole skeleton, are enclosed in a horny coating (Plate XXX., fig. 17), about half as thick as the fibres which originate from it. This coating is stratified; but the layers are not very clearly visible.

The presence of these sand grains is rendered particularly remarkable by the fact, that no sand whatever occurs in the outer skin of the sponge. As a rule we find in the skin of such sponges which contain foreign bodies in their fibres, also similar foreign bodies, in the skin.

There can be no doubt that these sand grains are originally attached to the tips of the conuli, and from thence they *apparently* wonder centripetally because they *actually* remain in the same place whilst the sponge is growing and the conuli extend beyond them. They are then sought by the growing horny fibres and retained in their joining points.

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(1) *H. J. Carter.* Contributions to our Knowledge of the Spongida. Annales and Magazine of Natural History. Series 5, Vol. XII., p. 309.

(2) *N. Poléjaeff.* Report on the Keratosa. The Zoology of H.M.S. Challenger. Part XXXI., p. 28.

HISOTOLGY.

Although our sponge does not present any interesting peculiarities in most respects, it is still remarkable for the development of its nervous system.

I have found that the surrounding of the horny fibres near the tips of the conuli are very similar to those described by me of the Australian Aplysillidæ (1). As in those we find (Plate XXX., fig. 18) a coating of Spongoblasts around the growing fibre (*S*). These are very small, measuring only 0·006 mm., in length, they are three times as high as broad. In the distal, rounded end we find a very elongate nucleus. Outside, this layer of Spongoblasts is covered by a layer of spindle-shaped longitudinal tissue cells (*B*). Here and there we find a thread formed of similar cells (B') extending through the soft part of the sponge and joining the hollow cylinder formed by those tissue cells which cloth the horny fibre.

The horn fibre is clearly striated (*H*) and a granular axial canal (*A*) can be detected.

THE NERVOUS SYSTEM.

(Plate XXXIV., fig 23.)

The reader will remember, that elements of *calcareous* sponges (2), have been described by me as being nervous cells. In Aulena similar elements have been found by me, which I consider to have a nervous function.

At the joining lines of the membranes which pervade the vestibule space, where the membranes are thickened, numerous spindle-shaped cells are found in groups. These are immersed in the ground substance and vertical to the surface.

They are 0·01 mm. long, and in the middle 0·002 mm. thick. The distal end is protracted to form a short hair or cilia, a Palpocil

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(1) *R. v. Lendenfeld.* Ueber Coelenteraten der Südsee, II. Mittheilung Neue Aplysinidæ Zeitschrift für wissenschaftliche Zoologie. Band XXXVIII.

(2) *R. v. Lendenfeld.* The Histology and Nervous system of Calcareous Sponges. Proceedings of the Linnean Society. Vol. IX.

(Plate XXXIV., fig. 23, *T*), which projects beyond the surface to some distance. (1)

The protoplasm of these cells is very intransparent, and shows after treatment with osmic acid the large dark granules peculiar to the sensitive protoplasm of Hydromedusæ after treatment with the same re-agent. The nucleus is large, elongate and oval.

Below, these cells taper or widen and seem to send forth threads of Protoplasm which pervade the ground-substance.

These threads are very indistinct and only rendered visible by the large black granules imbedded in them after treatment with Osmic acid.

Below these groups of sensitive cells, we find large, and beautifully developed multipolar Ganglia cells, with numerous much ramified processes on all sides, a dark granular protoplasm and a spherical nucleus in the centre.

These elements measure 0·01 mm. across ; the nucleus has a diameter of 0·005 mm. This nucleus appears nearly black after treatment with osmic acid and picric acid carmin. (Plate XXXIV., figs. 23, *g*.)

A direct communication between the basal centripetal processes of the sensitive cells and the ramifications of the nerves which originate from the ganglia cells has not been observed by me with sufficient clearness. I think that the figure represents well what I have seen ; even with the homogeneous immersion the doubts could not be removed on this score, but *I believe* that such a connection does exist.

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(1) The nervous elements can be seen in alcohol-carmin specimens, but they are much better visible in specimens treated with Osmic acid and stained with Picric acid carmin. It is necessary to make very fine sections to demonstrate these elements. The length of the Palpocil cannot be ascertained, because it naturally shrinks under the influence of Osmic acid. In the best sections I have, it projects beyond the surface about 6·002 mm. I believe, however, that it must be much longer in life. I have taken great pains to see these structures in the living state, and have drawn the palpocils according to what I believe to have seen. Anyone acquainted with the study of sponge histology will admit the great difficulty in the way of such observations, and will value the correctness of the result accordingly. This of course only relates to the *length* of the pelpocil, its *presence* cannot be doubted.

The membranes are covered on either surface by a flat Ectodermal Epithelium. (Plate XXXIV., fig. 23, *d*.) In the ground substance spindle-shaped cells are found which traverse the membranes in all directions. (*c*) I do not doubt that some of the fibres originating from the ganglia cells are connected with those elements which I consider as muscle cells.

By the sensitive cells the conditions of the water around them is felt and an irritation transmitted to the ganglia cells below. There a decision is arrived at, what should be done, provided these outer conditions and with them the nervous irritation change. The ganglia cells irritate the muscles, and so the pores in the membranes can be dilated or contracted, and the current of water changed and regulated with advantage to the sponge. Whether any consciousness is connected with this process or not is hard to decide. The whole process certainly has the appearance of a very simple reflex action, so that a consciousness, in the human sense can hardly be assumed.

GEOGRAPHICAL DISTRIBUTION.

East Coast of Australia, Port Jackson. (Ramsay, von Lendenfeld.)

BATHYMETRICAL DISTRIBUTION.

10-40 metres.

The specimens from greater depth appear to possess longer villi and a more massive shape, those from shallow water are more flattened and more smooth.

As the sponge, however, appears to be rare I am not able to establish any bathymetrical varieties from the observations at my disposal. Nardorus and Auloplegma forms have been dredged from all these depths.

VARIETIES.

There are, as mentioned above no great varieties in the shape of this sponge. Some possess Pseudoscula as described, whilst others are Aulaplegmaforms. I propose to establish two varieties for this species accordingly.

I. AULENA VILLOSA AULOPLEGMA,

WITHOUT PSEUDOSCULA.

II. AULENA VILLOSA NARDORUS,

WITH PSEUDOSCULA,

65. SPECIES.

AULENA FLABELLUM, NOVA SPECIES.

This species has been obtained only as Auloplegma, without Pseudoscula.

SHAPE AND SIZE.

As indicated by the specific name this species is flat, extended, frondose and fan-shaped with a short peduncle. The sponge does not seem to grow to any large size. The largest specimens measure 40 mm. in height, 50 mm. in width; and the plain fan which they form has a thickness of 4-6 mm. The peduncle is circular cylindrical 4 mm. high, and in the central thinnest portion 8 mm. thick,

COLOR.

Alive in spirits and dry of nearly the same colour, always dirty grey.

SURFACE.

The villi are disposed in a somewhat regular manner, so as to form straight lines, which radiate towards the margin from the top of the peduncle. Otherwise this species represents Aulena villosa very closely in the structure of its surface.

STRUCTURE.

The internal structure is closely allied to that of the foregoing species, the skeleton indicates however, a tendency to form main radiating fibres in this way, that at certain intervals, portions of the uniform network of threads are slightly thickened (Plate XXXV., fig. 25.) From joint to joint such fibres are thickened, which lie in a radiating line, and so a main fibre is indicated.

This fibre retains however, the crooked coarse of the fibres by the thickening of which it has been formed and never contains foreign bodies.

GEOGRAPHICAL DISTRIBUTION.

East Coast of Australia, Port Jackson (Von Lendenfeld, Ramsay); Broughton Island (Ramsay).

BATHYMETRICAL DISTRIBUTION.

From 0-50 meters in Port Jackson, in shallow water at Broughton Island.

The shallow water specimens from Broughton Island are the largest, and present the most regular fan-like shape.

66. SPECIES.

AULENA NIGRA, NOVA SPECIES.

Only Aulophlegma forms without Oscula have been obtained,

SHAPE AND SIZE.

This sponge is Chaliniform in as much as it presents the shape of a much curved circular cylinder about 8 mm. in diameter. Generally several cylinders of this kind grow out from an irregularly lobed basal mass. They rarely coalesce for a short distance. Every one however, retaining its individuality. The cylinders grow to a length of 50 mm. In the largest specimen there were five cylinders extending in the same direction, the largest of which measured 8 x 50 mm.

SURFACE.

The villi are shorter and more rigid than in either of the foregoing species, about 1 mm. high, 1 mm. thick and 1-5 mm. apart from one another.

COLOR.

The sponge is in spirits intensely black, as the specific name implies. In the interior it has a dark brownish grey color. The black pigment is found in the surface only.

Structure.

Main radiating fibres are still more developed than in the foregoing species. They have been formed apparently by local thickenings of the originally uniform network, but they are nearly straight, broken and abruptly bent only here and there, about twice as thick as the other fibres, which are similar to those of Aulena villosa (Plate XXXV., fig. 26.) These main fibres contain no foreign bodies. They are very rare, about 0·6 mm. apart from one another. They are not found in the villi.

Geographical Distribution.

East Coast of Australia, Port Denison, Queensland (Ramsay.)

Bathmetrical Distribution.

Shallow water, to 20 metres.

29. GENUS HALMOPSIS, (1) NOVUM GENUS.

Auleninæ with secundary diaphragm lamellæ in the vestibule space, which consist like Aulena of a reticulate sponge structure. The terminations of the fibres project, as in that genus beyond the surface of the sponge forming villi. The skeleton consists of radiating main fibres, which are straight and completely filled with foreign bodies and tangental, connecting fibres, which have a diameter one-tenth that of the main fibres.

These fibres are clear and contain no foreign bodies.

This genus is intermediate between Aulena and Halme. Similar to the first in the high development of its vestibule cavity and similar to the second in the formation of the skeleton.

67. SPECIES.

HALMOPSIS AUSTRALIS, NOVA SPECIES.

Only Auloplegmaforms have been observed.

Shape and Size.

This sponge resembles Aulena villosa in outer appearance pretty closely. The usual shape is that of a flattened sphere. The sponge attains a height of 30 and a horizontal diameter of 60 mm. A vertical section appears oval, a horizontal one circular. As stated above no specimens have been seen by me with a Pseudosculum, all are Auloplegmaform.

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(1) Halmopsis = deceptively like Halme.

COLOR.

Alive, in spirits and dry this sponge is gray. In the dry state of a lighter hue than otherwise. In the interior the color is a little darker than on the surface.

SURFACE.

The surface is very similar to that of Aulena Villosa. The villi are scattered and not disposed in lines. They are long and slender and very close together, attaining a height of 2-3 mm., and a diameter of 0·8-1·2 mm. They are on an average 1 mm., apart.

STRUCTURE.

The peculiarities of the internal structure have been referred to above in the diagnosis of the genus. The skeleton is very similar to that of Halme and evidently our sponge in this respect forms a connecting species between Aulena nigra and the Halme species.

The structure of the sponge body, the development of diaphragm-membranes in the vestibule, etc., on the other hand closely resemble those structures in Aulena. The soft part and the histological structure likewise resemble Aulena very closely.

GEOGRAPHICAL DISTRIBUTION.

East Coast of Australia, Port Jackson (Von Lendenfeld).

BATHYMETRICAL DISTRIBUTION.

20-40 metres.

EXPLANATION OF PLATES.

PLATE XXVI.

Fig. 1.—Halme Nidus Vesparum. R. v. L. Bulbous Form with small pores from Port Jackson. Drawn from life. Natural size.

Fig. 2.—Halme Nidus Vesparum. R. v. L. Form with finger-shaped processes, with larger polygonal pores from Port Stephens. Drawn from a spirit specimen. Natural size.

Fig. 3.—Halme simplex. R. v. L. Brown specimen with wide lacunæ from Torres Straits. Drawn from a spirit specimen. Natural size.

PLATE XXVII.

Fig. 4.—Halme Nidus Vesparum. R. v. L. Transverse section through the specimen represented in fig. 1, the bulbous variety. Drawn from a thick section. Natural size.

Fig. 5.—Halme Nidus Vesparum. R. v. L. Transverse section through a specimen of the finger shaped variety, represented in fig. 2. Drawn from a thick section. Natural size.

Fig. 6.—Halme simplex. R. v. L. Transverse section through the specimen represented in fig. 3. Drawn from a thick section. Natural size.

Fig. 7.—Halme Nidus Vesparum. R. v. L. Transverse section through one of the finger shaped processes of the specimen represented in fig. 2. Alcohol alum-carmine specimen. Taken from one of a series of sections. Magnified 50:1. (*O*). Portion of the outer surface of the sponge. (*I*). Portion of an internal lamella. (*P*). Pores of the inhalent canal system. (*T*). Large foreign bodies, sand granules, forming a dermal armor on the exposed outer surface. (*f*). Small foreign bodies, mostly sand granules forming a dermal layer on the surface of the internal lamellæ. (*s*). Subdermal cavities of the inhalent canal system. (*e*). Inhalent canals. (*a*). Exhalent canals. (*H*). Radial, knobby main fibres, which are filled with large sand granules similar to those in the external cortex. (*V*). Tangental, solid and slender connecting fibres which are free from foreign bodies. (*G*). Ciliated Chambers.

PLATE XXVIII.

Fig. 8.—Halme Nidus Vesparum. R. v. L. Portion of the skeleton in the interior of the sponge (the skeletons of the differently shaped

varieties are not different from one another.) Specimen macerated in fresh water. Magnified 35:1. (*H*). Radial main fibres with large sand granules in dense masses in the centre. (*V*). Hyaline tangental connecting fibres free from foreign bodies.

Fig. 9.—Halme Nidus Vesparum. R. v. L. Surface view of a pore in the outer surface of the external lamellæ with sieve membrane at the commencement of an inhalent canal. Osmic acid-alcohol specimen. Magnified 700:1.

Fig. 10.—An Oscillaria which is generally found in abundance in the outer surface of the external lamella of Halme species. Drawn after life from a teased portion of the sponge. Magnified 2,000:1.

Fig. 11.—Halme Nidus Vesparum. R. v. L. Portion of a longitudinal section, showing the ciliated chambers in the dividing membrane. Alcohol-alum carmine specimen. Magnified 850:1. (*E*). Inhalent canals. (*A*). Exhalent canal. (*P*). Chamber pores (inhalent). (*O*). Chamber osculum (exhalent aperture in the chamber wall). (*V*). A very fine connecting fibre cut through. (*S*). Stellate tissue cells. (*G*). Ciliated chambers.

PLATE XXIX.

Fig. 12.—Halme Nidus Vesparum. R. v. L. Longitudinal section through portion of the finger shaped variety represented in fig. 1. Combined picture. Magnified 35:1. (*O*). An osculum. (*P*). Pores to the inhalent canals.

Fig. 13.—Halme Nidus Vesparum. R. v. L. Axial section through a ciliated chamber. Osmic-acid specimen teased out Combined picture. Magnified 2,000:1. (*E*). Inhalent canal. (*A*). Exhalent canal. (*P*). Inhalent chamber pores. (*O*). Exhalent chamber pores. (*S*). Stellate tissue cells. (*d*). Flat epithel cells of the canals.

PLATE XXX.

Fig. 14.—Aulena villosa. R. v. L. A specimen with radial villi and spherical in shape seen from above from a depth of 30 meters Drawn after life. Natural size.

Fig. 15.—Aulena villosa. R. v. L. Side view of a specimen with ascending villi of oval shape from a depth of 40 meters. Drawn from life. Natural size.

Fig. 16.—Aulena villosa. R. v. L. Surface view of the outer horny membrane covering one of the large sand granules in the skeleton, from a specimen macerated in fresh water. Magnified 1,000:1.

Fig. 17.—Aulena villosa. R. v. L. Margin of a particularly large sand grain of the skeleton from a specimen macerated in fresh water. Magnified 400:1. (*H*). Horny fibre. (*M*). Horny membrane. (*A*). Axial canal of the horny fibre.

Fig. 18.—Aulena villosa. R. v. L. Transverse section through a horny fibre just below the point of growth. Osmic-acid alum carmin specimen. Magnified 1,000:1. (*A*). Axial canal. (*H*). Stratified horny substance. (*S*). Coating of spongoblasts. (*B*). Tissue coating. Transverse section through the longitudinal, spindle-shaped tissue cells. (*B'*). A tissue thread consisting of spindle shaped tissue cells which attaches itself to the tissue coating of the horny fibre.

Plate XXXI.

Fig. 19.—Aulena villosa. R. v. L. Section through the outer portion of the sponge. Alcohol-alum-carmin specimen. Drawn from a thick section. Magnified 10:1. (*L*). Lacunose tissue of the vestibule. (*S*). The reticulate body of the sponge itself. (*S'*). Free portions of the sponge body projecting beyond the surface—rounded conuli.

Fig. 20.—Aulena villosa. R. v. L. Longitudinal axial section through the specimen represented in fig. 14. Drawn from a spirit specimen cut in two. Natural size.

Plate XXXII.

Fig. 21.—Aulena villosa. R. v. L. Radial section through the distal portion of the sponge. Two conuli are cut through and appear extending beyond the lacunose tissue of the vestibule. Combined picture. Magnified 50:1.

Plate XXXIII.

Fig. 22.—Aulena villosa. R. v. L. Skeleton of the distal portion of the sponge. Macerated in fresh water. Drawn from a thick section made by hand. Magnified 50:1. (*L*). Lacunose system of the vestibule. (*S*). Portions of the real sponge tissue. (*S'*). Free projecting portions (conuli.)

PLATE XXXIV.

Fig. 23.—Aulena villosa. R. v. L. Section through a portion of the sponge in the interior. Osmic acid picro carmin specimen. (Cilia, collare and amœboid wandering cells from teased specimens after life.) Magnified 900:1. (*L*). Lacunæ of the vestibule. (*P*). An inhalent pore. (*S*). Sieve membrane. (*s*). Subdermal cavity. (*E*). Inhalent canal. (*A*). Exhalent canal, (*p*). Chamber pores. (*o*). Chamber oscula. (*G*). Ciliated chambers. (*H*). Horny fibre. (*a*). Spongoblasts. (*b*). Amœboid wandering cells. (*c*). Elongate, spindle shaped cells of a muscular and connective nature. (*d*). Ectodermal flat epithelium. (*e*). Entodermal flat epithelium. (*f*). Sensitive cells in the thickenings at the locality where the lamellæ of the vestibule join. (*T*). Palpocils. (*G*). Ganglia cells.

PLATE XXXV.

Fig. 24.—Aphrodite Nardorus. R. v. L. Longitudinal section through the sponge. Half the natural size drawn from a spirit specimen cut in half. (*O*). Pseudoscolum. (*o*). Oscula. (*A*). Exhalent canals. (*P*). Pseudogaster.

Fig. 25.—Aulena flabellum. R. v. L. Portion of the skeleton from a specimen macerated in fresh water. 20:1. (*H*). Main fibres. (*V*). Connecting fibres.

Fig. 26.—Aulena nigra. R. v. L. Portion of the skeleton from a specimen macerated in fresh water. 20:1. (*H*.) Main fibre. (*V*). Connecting fibre.

ON A SPONGE DESTRUCTIVE TO OYSTER CULTURE IN THE CLARENCE RIVER.

By R. von Lendenfeld, Ph.D.

I was lately instructed by the Commissioners of Fisheries, to report on a sponge injurious to oyster culture in the Clarence River. Some of the facts noticed in this report are here mentioned, as I think they will be of general interest.

The locality which was affected and which I was to report upon, I did not personally visit, and the information and specimens on which my report was founded were derived entirely from Mr. Woodward, the intelligent lessee of the oyster beds in question.

The whole nearly of that part of the bed of Clarence River, which is situated in proximity to a lake, and also a portion of the lake itself, was covered five years ago by an extensive oyster bed.

In a small portion of this area, where the river joins the lake, four years ago an overgrowth made its appearance, which smothered all the oysters and prevented the setting of the spat. Consequently no oysters have been procured from this area during the last few years, whilst formerly the same area yielded, as I have been informed, thousands of sacks. The lessee ascribed this to the existence of the overgrowth mentioned above.

I have examined specimens of it, and have found that it is a sponge belonging to a species new to science. The sponge grows on the outer side of oyster shells, which in that locality form the bottom.

The sponge consists of numerous flattened, finger-shaped processes joined at the base to form a bulky mass. The color is light brown. The size of the largest specimens seen by me is 7″ x 3″ x 4″.

The finger-shaped processes attain a length of 4″ and a diameter of ¾ of an inch. They terminate either with a rounded cone or show a tendency to bifurcation near the termination.

The surface of the sponge is smooth, here and there smal apertures with a circular circumference and a diameter of 0·1 inch occur. These are slightly raised above the general surface of the sponge, and more numerous towards the tips of the finger-shaped processes than in other parts.

The base of the sponge adheres very rigidly to the oyster shell.

The microscopic investigation reveals a skeleton, consisting of a network of exceedingly slender, anastomosing threads, consisting of dense masses of silicious spicules.

The spicules are simple, rod-shaped, slightly bent and pointed abruptly at each end, the outer apparently smooth surface is pervaded by numerous pores closed externally by a sieve with extremely fine perforations.

These holes lead into extensive lacunose sub-dermal cavities from whence canals originate, which extend in a centripetal direction, and which continually ramify, supplying small ciliated chambers situated in the interior. From these other canals originate, which unite to form wide oscular tubes.

It appears that five years ago this sponge did not occur in the locality, that afterwards the sponges made their appearance and killed the oysters thereon, and covered that area with a dense growth of sponges, standing so close to one another, that there was no room for the oysters between them.

The most interesting fact however, is that now since all the oysters have died out, the sponge is likewise disappearing, and great patches of the bottom in that locality are already clean.

It appears from the above that the sponge described, which I have named *Chalinula Coxii*, grows on the shells of living oysters, but disappears after the oysters are dead, and further, that the sponge exerts some direct influence on the oysters, which is so detrimentary to the latter that they die.

There is certainly no direct connection between the oyster animal and the sponge whatever, as the sponge only adheres to the outer surface of the shell.

That the sponge does not draw its nourishment, as a parasite would, from the oyster animal, can also be demonstrated by the fact, that the sponge grows on other submerged bodies besides the oyster shell.

The sponge can therefore on no account have a direct effect on the old oysters.

The sponge might, however, perhaps have a detrimentary effect in an indirect manner.

Both the sponge and the oyster live on microscopic particles of a digestable nature.

The sponge overgrowing the oyster will therefore intercept and retain a great portion of that food, the whole of which would, were the sponge not present, be available for the oyster. The sponge takes the food away from the oyster and thrives at the expense of the latter.

In this way the sponge will have a bad effect on adult oysters, but in no other. It appears clear, however, that the sponge will, where it is dominant, prevent the setting of the spat, as the spat cannot set on the sponge itself and the sponge takes up the whole of the area. I think that these conclusions will satisfactorily explain the facts observed.

The sponge settled on the oyster bed and spread there rapidly taking up all the space. The spat could not set. The old oysters died for want of nourishment and finally no live oysters remained in the locality.

The fact that the sponges are now again disappearing shows that they depend to a certain extent, probably, on the oysters.

Around the oysters always a superabundance of microscopic animals congregate, which feed on the excrements of the oysters, and it is probable that the sponges lived to a great extent on them.

Some species of sponges are found only in water with strong currents, and it seems not improbable that that is also the case with our *Chalinula Coxii*. In the locality where the sponges have taken possession of the oyster bed the channel is narrower and shallower than it is in other parts, and consequently the currents in that part must be stronger than elsewhere.

REMEDY.

In the oyster beds along the shores of the Mediterranean, sponges of various kinds, especially species of the genus of Euspongia, sometimes smother the oysters in a similar manner as has been observed in the Clarence.

In Trieste the oysters are grown on submerged trees, on which the spat readily sets and which are taken from the water and divested of their marine fruit as required.

It sometimes occurs that sponges grow on these oyster-trees. The effective remedy against these sponges is to take the tree from the water during rain.

The fresh water kills all the sponges in a few hours during which period the oysters are of course not at all affected by being out of the sea. The tree is, after several hours, placed in the sea water again and the sponges rot and fall off. In our case such a remedy can of course not be employed.

The only suggestion which seems possible is to lead fresh water through pipes to the infected locality, and in this way gradually kill all the sponges.

NOTE ON THE GLACIAL PERIOD IN AUSTRALIA.

By R. von Lendenfeld, Ph.D.

In the proceedings of the Linnean Society of N.S.W., Vol. X., Part I., I have given a description of the valleys around Mount Kosciusco, and have stated as the result of my examination of those parts, that—(1.) The plateau in the central part of the Australian Alps, was glaciated not so very long ago, and since, that part of Australia had obtained its present aspect, down to a height of 5,800, and (2.) No traces of pre-historic glaciers have been observed by me in the Kosciusco Group of Mountains below the height given above.

Recently I have seen some photographs of glacier polished rocks, which being siluro-devonian, and not granitic as those observed by me on Mount Kosciusco, have retained the striæ or scratches made by the hard stones imbedded in the bottom of the ice stream which once moved over them, very well.

These rocks are situated in the Mount Lofty Group of Mountains near Adelaide, and while their appearance furnishes an additional proof to my statement, that Australia had been subject to glaciation; it shows at the same time that near the southern coast the glaciers must have descended much further than round Mount Kosciusco, as the height of the lofty mountains barely exceeds 2,000 feet.

It appears doubtful, however, whether the striæ referred to are isochrone with the glacial traces I discovered on Mount Kosciusco.

JOTTINGS FROM THE BIOLOGICAL LABORATORY OF SYDNEY UNIVERSITY.

By William A. Haswell, M.A., B.Sc., F.L.S.
Lecturer on Zoology and Comparative Anatomy, &c.

4. An Australian Species of *Bonellia*.

About a year ago Dr. R. von Lendenfeld and myself discovered on the shores of Neutral Bay, Port Jackson, several specimens of a species of *Bonellia*. Instead of inhabiting, like its European congener, narrow fissures in rocks, from which the soft-bodied animal can only be extracted entire by the exercise of extreme care, these species were found under small stones just about the limit of low water. I had on numerous occasions previously gone over the very same ground on the out look for various invertebrates without ever having seen a trace of this remarkable creature; and Dr. Lendenfeld informs me that he has very frequently visited the same spot since, and has hunted carefully for the *Bonellia*, but has never found any. A few weeks ago, however, on revisiting the spot I found several specimens apparently under the very same stones.

On a careful comparison of the specimens with a specimen of *Bonellia viridis* from Naples in the type collection of the University, and with the description and figures of Lucaze-Duthiers (1), I can find nothing in the external appearance—the colour, form of the body, shape and size of the bifurcated tentacle—to distinguish the Australian species from the European one, and the same result follows an examination of most of the internal organs: the alimentary canal, branched appendages and the nervous system coincide exactly. In the reproductive organs there are certain differences; but as none of my specimens had the ovaries ripe it will be necessary to obtain further material before coming to a decision on this point.

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(1) "Recherches sur la Bonellie," Ann. Sc. Nat., 1858.

5. "AQUATIC RESPIRATION" IN FRESH WATER TURTLES.

Simon H. Gage (1) announced in 1883, that he had observed the Soft-Shelled Turtle of the United States (*Aspidonectes spinifer*), to be in the habit, when lying at the bottom of a tank, of taking water into the pharynx and expelling it again at regular intervals. The very same process takes place in the common Australian Long-Necked Fresh-Water Turtle (*Chelodina longicollis*) which has recently been figured and re-described by McCoy. (2) At more or less regular intervals the floor of the mouth is depressed, exactly, as remarked by Gage, by the same movement as that observed in the Frog in breathing air; the loose walls of the pharynx swell out, and after a short interval the hyoid bone and the floor of the buccal chamber are raised again. A careful observation showed that these movements are accompanied by the alternate inhalation and exhalation of a considerable volume of water as evidenced by the movements of floating particles, and the question at once arises—Is this a form of auxiliary respiration by means of which the blood of the reptile is aërated during its prolonged immersions in pursuit of food? In the case of the American species Gage answers this question in the affirmative, and bases his conclusion mainly on the presence, as observed by Agassiz, of a series of papillæ on the walls of the pharynx, and on the relatively small lung-capacity of the species.

Neither of these conditions hold good in the case of the Australian species. The pharynx is lined by a perfectly smooth mucous membrane which is not in any high degree vascular, and is clothed with a fairly thick stratified epithelium: while the lungs are of enormous capacity, lining the whole of the dorsal aspect of the body-cavity, from the root of the neck to the root of the tail. That the phenomena described partake of the nature of a process of auxiliary respiration, seems, then, extremely improbable. An animal of such very moderate vital activity as a Chelonian, and with such a reservoir for oxygen as it possesses in its lungs, could only require such a special auxiliary respiratory process, were its periods of immersion extremely prolonged. All Chelonians breathe with great slowness and will bear deprivation of oxygen for a very long time without injury. I am therefore induced to regard this inhalation and exhalation of water as having no functional importance, but rather to be of the nature of slight spasmodic movements produced probably by the rhythmical action of the respiratory mechanism.

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(1) "Proceedings of the American Association for the Advancement of Science," August, 1883. The communication is quoted in full by W. K. Parker. ("Mammalian Descent," pp. 56-58.)

(2) "Prodromus of the Zoology of Victoria."

ON THE SUPPOSED GLACIAL EPOCH IN AUSTRALIA.

BY CAPTAIN F. W. HUTTON, F.G.S.,

HON. MEM. LIN. SOC., OF N. S. WALES.

Several geologists have imagined that the glacial epoch, which overspread Europe and N. America in the pleistocene period, had its counterpart at the same time in the Southern Hemisphere. This northern glacial epoch is supposed, with great probability, to have been due in large part to the high eccentricity of the earth's orbit which occurred from 80,000 to 200,000 years ago; since which time the eccentricity has been diminishing. Reasons however have been repeatedly given by New Zealand Geologists for dissenting from the idea that the Southern Hemisphere has suffered a glacial epoch, and in my last papers on the subject, I pointed out that high eccentricity would not produce a severe antarctic climate, owing to the small quantity of land in this hemisphere which is not already covered with snow; but that high eccentricity might produce a pluvial or diluvial epoch. (1) These reasons I need not recapitulate; but quite recently the new hypothesis has been broached that the Southern Hemisphere has had a small glacial epoch of its own some 2,000 or 3,000 years ago. No attempt has been made to account for this remarkable episode. It cannot have been due to great geographical changes in the Antarctic Ocean, for that is disproved by the short time that has since elapsed, and by the number of endemic species, and even genera, of plants found in the Antarctic Islands. Neither can it have been due to any astronomical or cosmical cause, because then it would have affected the Northern Hemisphere as well. As this hypothesis has been started by such a distinguished zoologist and mountaineer as Dr. von Lendenfeld, whose words must carry weight, it is necessary that both the observations on which it is founded and the inferences drawn from them should be carefully examined; for, if it really occurred, it must have been one of the most incomprehensible episodes in the history of the earth. It will, however, take very strong evidence to establish it.

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(1) N. Z. Journal of Science, Vol. II., p. 266, and Quar. Jour. Geol. Soc., Vol. 41, p. 213.

EVIDENCE FOR THE SOUTHERN GLACIAL EPOCH.

1. During a recent exploration of the central part of the Australian Alps, Dr. von Lendenfeld discovered traces of ancient glaciers, and, on the strength of this, he asserts "that Australia also has passed through a glacial period." (1) This discovery is highly interesting, and I do not wish to deny the former existence of these glaciers; on the contrary I think them highly probable, but we must bear in mind that the only evidence for them at present is the occurrence of *roches montonnées* and smoothed surfaces of *decomposing granite*, at a level of 5800 feet and upwards: it is expressly stated that no moraines have as yet been found. But although I do not wish to deny the former existence of these glaciers, it is necessary to point out that it by no means follows that they were caused by a glacial epoch; because they might equally well have been due to greater elevation combined with greater atmospheric moisture, and no evidence is given to show that elevation has not occurred.

2. The only other Australian evidence for a glacial epoch admitted by Dr. von Lendenfeld is the occurrence of granite erratics on the beach, near Adelaide, which were discovered, I believe, by Prof. R. Tate, and which Dr. von Lendenfeld says were probably "deposited on the beach by icebergs stranded there, which may have drifted to the south coast of Australia from the South Pole at the time it was cooler in the Southern Hemisphere then at present."

This is real evidence for a glacial epoch for, if true, it necessitates a colder climate, which the mountain glaciers do not.

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(1) Proc. Lin. Soc. of New South Wales, Vol. X., p. 44.

Let us examine it. The granite composing these erratics has not been described, and I am not aware that any attempt has been made to trace their origin. Dr. von Lendenfeld suggests the South Pole, but I am afraid it will take a more arduous journey than the ascent of Mount Townsend to verify the existence of granite there. All the land that has been examined at present in that direction is volcanic; and if ice-borne erratics had travelled from the antarctic continent to S. Australia we should expect to find them also in abundance in Tasmania, New Zealand, and the Antarctic Islands, and that some would be volcanic rocks, which is not the case. We must always distrust an attempt to explain an isolated phenomenon by means of a wide-spread cause. If these erratics had been derived from Tasmania or New Zealand, we should expect that most of them would be gneiss or schist, or sandstone; while granite would be rare. Large granite blocks, brought down by ice, are found in preservation Inlet in New Zealand, but this granite is a remarkable one, and a fragment of it could probably be recognised. From Australia itself the erratics could not have come *if they are ice-borne*, because Australia could not have been sufficiently glaciated to furnish icebergs.

But are these erratics so huge that we are necessarily shut up to the conclusion that they are ice-borne? I believe they are described as "small," and consequently they may perhaps have been conveyed to their present position by floating seaweed or by means of ascidians: or possibly they may have been ballast of a ship. I merely throw out these suggestions, for as I have not examined the locality I cannot judge of the evidence; but the iceberg theory is such a very improbable explanation of the occurrence of erratics in the latitude of Jervis Bay, or the North Cape of New Zealand, that we must hesitate before accepting it as true.

3. In another and earlier paper on the same subject Dr. von Lendenfeld says "Von Haast has furnished a map of the glaciers of the cold period [of New Zealand] which shews that several of the ice streams at that period extended down to the sea. I had occasion to observe the characteristic scratches on the rocks in the

Sounds on the West Coast close to the water's edge which prove the correctness of Von Haast's views." (1) But Dr. von Haast's map only shows that the glaciers of the period *would* have extended into the sea *provided* the sea was then at its present position; and I have several times pointed out that there is no evidence at all in favour of the idea that the glaciers reached the sea, but that on the contrary the land at that time must have stood at a much higher level than now. Consequently old moraines at present on the shore line do not at all prove that the time of the greatest extension of our glaciers was a cold period. The same remarks apply to Dr. von Lendenfeld's own observations on ice scratches (2).

4. At the Meeting of the Linnean Society of N. S. Wales held on the 27th of last May, Mr. Wilkinson exhibited a collection of recent shells obtained from an estuarine deposit near Newcastle in which was a specimen of *Siphonalia maxima* at present only found in Bass' Strait, and Dr. Cox considered that this sub-fossil tended to confirm the hypothesis that a colder climate prevailed in N. S. Wales at some not very remote period. Now *noscitur a sociis* is a very useful adage in palæontology, but unfortunately in this case a list of all the shells found in the deposit has not yet been published. If *S. maxima* is associated with other Tasmanian species most of which do not live now so far north as Newcastle, then this will be by far the most important evidence of a southern glacial epoch ever advanced. But if, on the contrary, it is associated with N. S. Wales shells, as appears to be the case; then this new evidence will shew that in Tasmania it is a survival of a species once more widely spread, and will prove that Tasmania has *not* undergone a glacial epoch since *S. maxima* lived on its shores. I have not seen *S. maxima* but it appears to be the same as *Fusus subreflexus* Sowerby, in Darwin's Geological Observations in S. America; a species which is also found in the Pareora System in New Zealand, and which I believe to be, at best, only a variety of *S. dilatata* of North New Zealand, Australia, and Japan. Certainly it by no means gives the idea of a cold loving form.

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(1) Pro. Lin. Soc. of N. S. Wales, Vol. IV., p. 806.

(2) As ice scratches are very rare in the Sound it is a pity that Dr. von Lendenfeld has not given us the precise locality where he found them.

This is all the evidence of a glacial epoch in Australia, but before passing on to the next part of my subject there is one other point I must notice. Dr. von Lendenfeld has not correctly understood the argument against a southern glacial epoch derived from the fauna and flora of New Zealand; this however, is my own fault, for on referring to my paper, I find that I have not been sufficiently explicit on this head. He says, "Hutton is not inclined to believe that the glacial period in New Zealand was so severe as is generally believed, in consequence of the great abundance of animal life at the time. I must say that I do not see this at all" (l. c., p. 51.) But it is not on the great abundance of life at the time that I rely, but on the subtropical character of that life in the north, and especially on the local occurrence of warmth loving plants and animals in the south. For example I may note the occurrence of *Areca sapida* on Banks' Peninsula; of *Paryphanta Hochstetteri* in Nelson and Picton; of *Ranella leucostoma* and *Cassis pyrum* in Martin's Bay; and of *Triton Spengleri*, *Scalaria Zelebori*, *Cookia sulcata*, and others at Stewart Island. These are outliers, which have been isolated by a gradually cooling climate; the cooling being perhaps due to the shifting of winter in the Southern Hemisphere from perihelion into aphelion.

It appears therefore that while no attempt has been made to explain the difficulties which must be explained before we can believe that a glacial epoch has occurred in the Southern Hemisphere, the evidence brought forward in its favour is, to say the least, very defective.

DATE OF THE GLACIER EPOCH.

In New Zealand there are, as is well-known, ice-marks dating from the present day to some former period when the glaciers were at their greatest extent, and for many years New Zealand geologists have been accustomed to call this latter time the *glacier* epoch of New Zealand in order to distinguish it from a *glacial* epoch, which term implies a considerable reduction of temperature. The term glacier epoch does not imply any hypothesis as to the cause of the glaciers; but all New Zealand geologists, whatever views they may hold as to the cause, are of opinion that the *glacier* epoch was long anterior to the *glacial* epoch of Europe and N. America. (1)

Dr. von. Lendenfeld, however, has come to the remarkable conclusion that the glacier epoch in New Zealand "has not been more remote than two or three thousand years. (2) He bases this conclusion on observations he has made on the deltas at the mouths of the streams that run into the Sounds on the West Coast of Otago. "Scarcely," he says, "do we find a small delta sent up between the rocks at the mouths of the terminal rivers. This, together with the fact that the rivers bring down a great amount of rock and sand, shows that the Sounds cannot have existed long, for otherwise they would necessarily have been filled up more or less by the material which is continually being deposited at the bottom of their still waters." Unfortunately, Dr. von Lendenfeld does not give us any information as to which of the Sounds he has examined, so that it is impossible to test his statement in any particular case. I have myself only examined the heads of the following Sounds—Milford, Bligh, Bradshaw, and Preservation—so that my observations are not very extended, but so far as they go, they are at variance with those of Dr. von Lendenfeld. All these Sounds are shallow near their heads and afford good anchorage. Also, with the exception of Preservation, which is rocky, all have alluvial flats running for some distance up the valley at the end. In Milford the Cleddan Valley is not large, but that of the Arthur has considerable mud-flats and fluviatile deposits. The same is the case in the vallies at the heads of Bradshaw and Bligh Sounds, up which I went for some distance in 1874 prospecting for gold. Indeed I think that the fluviatile deposits are very considerable when we consider that none of the so-called "rivers" are more than ten or fifteen miles in length and often much less. These little streams are not to be compared to the Rhone where it runs into Lake Geneva, nor even to a small stream running from mountains exposed to great vicissitudes of climate; for the climate in the Sounds, although moist, is remarkably equable all through the year; and, with the exception of Milford, the sides of the Sounds and the ranges between them, are covered with dense vegetation. On the eastern side of the mountains, where the rivers are longer, the process of filling up has gone on much more rapidly, and has reached a point far in advance of the rivers in Switzerland, although the latter are much larger. The rate of filling in of a lake or Sound does not depend so much on the height of the mountains surrounding it, as on the size of the catchment basin which it drains. The islands in the sounds are not *moutonnées*, and although some of the smaller ones are rounded, they show no sign of lee and strike sides. The precipices on either side of the sounds are also, in general, quite rough, and I only noticed two localities (both previously observed by Dr. Hector) where there was any appearance of polishing. One was in Milford Sound on the south side of the entrance to the "Narrows," the other near Deas Cove in Thompson Sound (1) I saw neither grooves nor striæ; but Dr. Hector noticed them in Thompson Sound and in the Cleddan Valley. (2) All this is very different from any glaciated district in Scotland, Wales, or Ireland, where nearly every rock tells the same tale; and, judging from published accounts, it is very different from the Fiords of Norway, the rocks of which are much the same as those of the West Coast Sounds of New Zealand. Yet that these sounds have at one time been occupied by ice is proved by the huge granite boulders lying on the sandstones and mudstones at Kisbee Bay in Preservation Inlet. But I need not reproduce the evidence in favour of the very ancient date of the great glacier epoch of New Zealand, (3) I will only say that it seems to me to be of much greater weight than the attempt of Dr. von Lendenfeld to show that detritus cannot have been poured into the West Coast Sounds for a longer period than two or three thousand years; for he does not know the original depth of the sounds nor the amount of *débris* that is annually brought down.

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(1) See N. Z. Journal of Science, Vol. II., p. 266, and Ann. Mag. of Nat. Hist., ser. 5. Vol. 15, p. 97.)

(2) Pro. Lin. Soc. of N. S. Wales, Vol. IX., p. 808.

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(1) Geology of Otago, Dunedin, 1875, p. 67.
(2) Geological Exploration of the West Coast, pp. 458 and 461.
(3) See N. Z. Journal of Science, Vol. II., p. 262, and Ann. and M of Nat. Hist., Series 5, Vol. XV., p. 93.

Ten years ago I brought forward some reasons for thinking that a second, but smaller, glacier epoch occurred after the first had passed away. These reasons, however, were based entirely on some phenomena exhited by the river channels in Otago, which seemed to imply a second elevation; (1) for of course in the South Island of New Zealand every upheaval must cause the glaciers to advance and subsidence must make them retreat. In my report just quoted I said "That all our lakes are not filled up is probably owing to the second advance of the glaciers which partially scooped them out again." But the evidence for this statement is very slight, and I have not been able to add to it during the last ten years.

If now I should be asked to what then do you attribute the ancient glaciers of the Australian Alps? I should answer, It is more probable that Mount Kosciusco once stood some three thousand feet higher than at present, when Tasmania was joined to Australia, and Central Australia was, perhaps, a vast lake; than that the temperature of the surrounding ocean should have been reduced ten degrees without any apparent cause, which is the only alternative.

NOTES AND EXHIBITS.

J. Brazier, C.M.Z.S., &c., exhibited specimens of the shells, dried ink-bags, and pigment of both sexes of *Sepia plangon*, Gray, from Port Jackson, also similar preparations of *Sepia Capensis*, from Bondi. He also exhibited mounted specimens of the valves and mantles of *Chiton spiniger* Sowb., from Port Denison, and of *Chiton petholatus*, from Port Jackson.

Mr. Trebeck exhibited specimens of fungi from Fiji, all belonging to the family of *Polyporus;* and a specimen of hard subcrystalline Tertiary limestone, from Eucla, West Australia, containing a fossil Pecten.

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(1) Geology of Otago, pp. 84, 85, 88. and 94.

Mr. Masters exhibited a fine collection of the magnificent *Ornithoptera Brookeana*, from Borneo.

Mr. Fletcher exhibited examples of the young of *Pseudophryne Australis*, and mentioned some points of interest in regard to their development. The ova are laid under stones, after rain, on the margins of ponds. In about three weeks the embryos have reached the condition of fully formed tadpoles, which can sustain a prolonged postponement of their hatching. Specimens developed from ova collected more than three months ago were shown, in which the embryos were seen still coiled up in their gelatinous envelopes. When placed in water, a number of these tadpoles emerged within the space of an hour; a fact which explains their sudden appearance in swarms after heavy rain in places which had been previously quite dry. No traces of external gills were detected. A fuller account is in course of preparation.

Mr. A. Sidney Olliff exhibited the *Coleoptera* belonging to the groups *Clavicornia* and *Rhynchophora*, collected by Mr. Edward Whymper during his ascent of Chimborazo, Pichincha, and other mountains in Ecuador. The species were mostly small and dull coloured, but were of great interest on account of their having been obtained at elevations varying from 1,400 to 16,000 feet. They will be fully described in the Natural History Appendix to Mr. Whymper's forthcoming work.

Mr. E. P. Ramsay, F.R.S.E., Curator of the Australian Museum, exhibited (1) a very large specimen of a sea urchin, *Tripneustes angulosus*, from the New South Wales Coast. (2) An Albino Tui or "Parson-bird" from New Zealand *Prosthemadera Novæ-Zelandiæ*, and (3), an Albino Ground Parrot, *Psephotus hæmalonotus*, which latter bird had been presented to the Museum by Mr. McCooey of Dubbo. This bird was obtained near Warren.

Mr. Ramsay also read a letter from Sir Richard Owen respecting a new species of *Thylacoleo*, the bones of which had been recently discovered in the Wellington Caves.

Mr. Macleay exhibited four immature specimens of *Holostoma alatum*, the *Distoma alatum* of Rudolphi, from a very young puppy. He said that this is believed to be the only Trematode

Worm which infests Dogs, but is much more common in the wild species, as the Wolf and Fox, than in the domestic animal. Its History is unknown.

Mr. Ratte read the following note explanatory of Plate 9, figs. 3 to 6, the references to which were accidentally omitted in his Paper on *Worthenia*. Figs. 3 and 4 *Ptychomphalus*, sp. nat. size. Fig. 5 the same enlarged 2½ times to show sculpture. This Fossil although possessing a round aperture is not a *Turbo*, and resembles in general appearance *Ptychomphalus Frenoyanus*, de Kon., from the Carboniferous Limestone of Visé Belgium; but the sculpture is not the same, the oblique striations visible in the figured specimens not showing in *Ptych. Frenoyanus*. Fig. 6, magnified or enlarged three times is another species of *Ptychomphalus*, with a well-marked sinual band. This specimen is not in the good state of preservation observable in the others. It is found in the limestone of Yass, and from the same locality as the supposed *Worthenia*.

Dr. Cox made some observations on the migrations of the Maray, the fish known as the "Australian Pilchard" and "Picton Bloater," *Clupea sagax*, and called attention to the importance of ascertaining the time and place of spawning.

WEDNESDAY, 26TH AUGUST, 1885.

The President, Professor W. J. Stephens, M.A., F.G.S., in the chair.

Mr. Severn and Mr. Knight were introduced as visitors.

MEMBER ELECTED.

The Rev. John Dixon, St. James' Parsonage, Wickham.

DONATIONS.

"Feuille des jeunes Naturalistes." Nos. 176, 177. June and July, 1884. From the Editor.

"Annales de la Société Géologique de Belgique." Tome X., 1882-3. From the Society.

"The Australasian Journal of Pharmacy." Vol. I., No. 1. From the Pharmaceutical Society of Australasia.

"Midland Medical Miscellany." Vol. IV., No. 42. From the Editor.

"Journal of the New York Microscopical Society." Vol. I., No. 5. From the Society.

"Science." Vol. V., Nos. 121-125. From the Editor.

"Descriptive Notes on Papuan Plants." VI. By Baron Ferd. von Mueller, K.C.M.G. From the author.

"Journal of the Royal Microscopical Society," London. Series II., Vol. V., Part 3. June, 1885. From the Society.

"Abstract of the Proceedings of the Royal Society of Tasmania." July 14th, 1885. From the Society.

"The Australasian Scientific Magazine." Vol. I., No. 1. From the Editor.

"Victorian Naturalist," Vol. II., No. 4, August, 1885. From the Field Naturalists' Club of Victoria.

"List of the specimens of Cetacea in the Zoological Department of the British Museum." From the Trustees.

"Zoologischer Anzeiger," VIII. Jahrg., No. 198. From the Editor.

"The Provincial Medical Journal," Vol. IV., No. 43. July, 1885. From the Editor.

"Description of a supposed new species of Flycatcher of the genus Rhipidura, from New Guinea." By E. P. Ramsay, F.R.S.E., &c. From the author.

"Sechster Jahresbericht des Naturwissenschaftlichen Vereins zu Osnabrück." 1883 and 1884. From the Society.

"Les Annelides Chetopodes du Golfe de Naples." Claparède. "Etudes sur les Infusoires et les Rhizopodes." Claparéde. "Recherches sur la Structure des Annélides Sédentaires." Claparéde. "Glanures Zootomiques parmi les Annélides." Claparéde. From the Hon. William Macleay, F.L.S.

"Transactions and Proceedings of the Royal Society of Victoria." Vol. XXI. 1884. From the Society.

PAPERS READ.

LIST OF PLANTS IN USE BY THE NATIVES OF THE MACLAY-COAST, NEW GUINEA.

By N. de Miklouho-Maclay.

With some Botanical remarks by Baron Ferd. von Mueller.

Revising my notes of the Ethnology of the Maclay-Coast, I made a list of plants, the parts of which (roots, stem, bark, leaves, flowers or fruits) are used by the natives as articles of food, as stimulants, or other purposes.

Some of these plants are cultivated by the natives in their plantations, some are gathered at certain times in the forests. The planting of the food plants is so arranged, that the natives are provided the whole year round with some special kind of food. The season of ripening of the principal food plants (taro, yams, sweet potatoes, &c.), is however not the same in different villages, but varies according to their different position, on the coast or in the hills. The time of collecting the products of cultivated plants mentioned in this paper refers to the coast villages, principally near to my two residences (Garagassi in 1871-72 and Bongu in 1876-77), near the Port Constantine.

On my return from New Guinea in 1873, I was fortunate enough to see in Java Dr. R. H. C. C. Scheffer, Director of the Botanical Garden of Buitenzorg, and of meeting Dr. O. Beccari in Singapore in 1878. I did not neglect during these interviews to ascertain, with their help, the systematic names of some plants, about which I was doubtful, and in which cases I had brought with me from New Guinea the fruits, or leaves and flowers.

A short visit to Melbourne in the beginning of this year, gave me the opportunity of consulting Baron von Mueller about some other plants from the Maclay-Coast, of which I had the fruits preserved in alcohol. Having neglected to obtain in New Guinea in addition to these fruits, the leaves and flowers of the same plant, the very incomplete collection would have been quite valueless, if it had fallen into less competent hands than those of the Baron von Mueller, and I feel very glad of being enabled to express my gratitude for his kind help. So, only through the kind assistance of these friends, I am able to give here the following list of useful plants, which are of great value in the household of the natives of the Maclay-Coast.

I. PLANTS USED AS ARTICLES OF FOOD BY THE NATIVES IN ORDER OF THEIR DOMESTIC IMPORTANCE.

A. Plants cultivated in plantations, or round the huts in villages.

1. *Cocos nucifera (Munki)* (1) bearing fruits the whole year round, is, without doubt, of the greatest value as food for the natives. The pulp of the nut is eaten in all stages of maturity. The scraped pulp of old nuts is used in cooking on account of its oily quality, but oilmaking and oil were not known to the natives before my arrival in 1871. There are two varieties of the cocoanut palm: the ordinary, with the large green nuts, and the other with the shorter stem and much smaller, orange coloured nuts. (2)

2. *Caladium esculentum* (*Bau*), 3 or 4 var., some of them of large size, is next to the cocoanut, the principal article of food of the natives, from March to August, being usually planted in October.

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(1) The native names of plants in the dialect of Bongu (of the Maclay-Coast) are added in parenthesis.

(2) The larger nuts of the ordinary green kind contains in the average 1200-1600 grammes of water, the smaller, orange coloured ones, in the average not more than 150 grammes. About the preparation of food by the Papuans and other details, vide my paper: Ethnologishe Bemerkungen über die Papuas der Maclay-Küste, publ. in Natuurkundig, Tijdschrift of Batavia, 1875. A review of which is given by Dr. J. C. Galton in "Nature" of June 1st and 8th, 1875.

3. *Diascorea Spec* (*Ayan*), many varieties, is eaten from August to January.

4. *Ipomaea Batatas* (*Degargol*). The sweet potato is, next to to the Taro and Yams, the most important article of food, and is ripe usually in September and October.

5. *Musa paradisiaca* (*Moga*), 8 or 9 var., are cultivated in some villages on a large scale, in others in limited quantities. Besides the cultivated varieties, which have been obtained by exchange between the villages, there is to be found in the forest a *wild* Banana (*Musa Maclayi*, F. v. M.), compared to the cultivated varieties, with a tall stem (nearly twice as tall), with narrow stiff leaves and small (not edible) fruits full of seeds. (1)

6. *Saccharum officinarum* (*Den*). Besides the many cultivated varieties there is also a *wild* Sugarcane, with a thin darkish stems growing in marshy localities.

7. *Saccharum* (*edule Hsskl ?*) (*Aus.*) (2) The panicle of this cane, which ripens in January and February, is eaten, stewed, or baked on coals, and is very much liked.

8. *Psophocarpus spec.* (*Mogar*). (3)

9. *Artocarpus incisa* and *A. integrifolia* known under the general name: *Boli*. There are 5 var. at least. The bread-fruit trees are

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(1) There is also another kind of *wild* Banana (*Musa Calosperma* F. v. M.), with fruits containing very large irregularly shaped seeds (about 10 mm. long and 11 mm. in diameter), which, when ripe. are of a brilliant black colour, are greatly used by natives as ornaments. About the two new species (*M. Maclayi* and *M. Calosperma*), vide Appendix, p. 355 and 356.

(2) Having neglected to obtain in New Guinea a specimen of "Aus," I could not ascertain the specific name of this gramineæ, but remembering that one of my servants, a Javanese, assured me many times that he knew the same plant in Java, used to call it something like "Grubuk," I wrote to the Director of the Botanical Garden of Buitenzorg and received a few days ago the following answer: . . . . Une plante appelée "*grubuk*" or "*groubouk*," n'est pas connue chez les malais et les soundanais. Cependant une Graminée savoir: le *Sacharum edule* Hasskrl. est appeé "*troubouk*," ou "*tebou troubouk*" par les Malais, j'ose supposer que le nom de "troubouk" est le vrai nom de les plante en litige. (Extract from the answer from Dr. W. Burck, Direct. adj. of the Bot. Gard. of Buitenzorg.)

(3) *Vide* Appendix, p. 358.

planted in or near the villages, but are to be found also not unfrequently in the forest.

10. *Canarium commune* (*Kengar*). Trees mostly planted, but growing also in the forests; are to be found very numerous in some villages, but are scarce near others. The nuts are gathered in May, June and July.

11. *Sagus spec.* (*Buam*). On account of the scarcity of this palm, the sago is regarded as a luxury, is seen only at feasts and is not an article of daily diet.

12, 13, 14, 15. Different kinds of *Curcubitaceæ* as: *Holl*, *Arwan*, and others.

B. *Plants of the forest sought for on account of their fruit, used as food.*

16. *Pangium edule* (*Orlan*) (1). The fruits are hung in great baskets upon trees in the forest; the pulp and kernels produce by fermentation an acid, very strongly, rather unpleasantly (to my olfactory nerves) smelling sauce, which mixed with food is considered by the natives as a great delicacy.

17. *Bassia cocco* (*Naté*) (2). the green fruit of which not larger than a middle sized apple have an agreeable sweet taste.

18. *Bassia Maclayana*, (Ferd. v. Mueller, n. sp.) (3), (*Dim*).

19. *Pandanus spec.* The fruits of different Pandani are eaten, raw or stewed.

20. *Barringtonia spec.* (*Togali*).

21. *Mangifera indica?* (*Oei*). The fruit small and rather acid, but quite edible; they taste better (less acid) when stewed.

22. *Citrus spec.?* The fruits have a very thick skin and are so bitter that they are scarcely eatable.

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(1) *Vide* Appendix, p. 356.
(2) *Vide* Appendix, p. 357.
(3) *Vide* Appendix, p. 357.

There are at the Maclay-Coast some other fruits which are gathered in the forest, whose systematical names however remain for the present unknown to me. I mention here the following names of Papuan fruits, which I frequently saw eaten and which I have tasted more than once myself without finding them either nasty or nice. They are:—

23. *Awal.*

24. *Bugger.*

25. *Kabul.*

26. *Aul.*

II. CULTIVATED PLANTS USED AS STIMULANTS AND MEDICINE.

27. *Areca catechu* is cultivated in every village and the kernel of the nut is used at the different stages of maturity, but young nuts are preferred.

28. *Piper betel.* The fruits are used in preference to the leaves. The natives of the Maclay-Coast have no remembrance, if the use of this (Areca-betel-lime) chewing combination has been introduced amongst them, by whom and when. Generally, the men are very fond of this stimulant, but very few use the same to excess.

29. *Piper methysticum* (*Keu*). The first mention of the use of the *Piper methysticum* by the natives of New Guinea, is, as far as I know, to be found in my letter to the Imp. Geogr. Society of St. Petersburg (1). When I showed in 1873, some dried leaves and fruits of the *keu* of the Maclay-Coast to Dr. Scheffer, he told me, that none had ever been brought by travellers returning from New Guinea and not having specimens of *P. methysticum* in the collection of the Botanical Museum of the garden of Buitenzorg, nor sufficiently complete descriptions of the plant, he was not able to tell me positively if the *keu* of New Guinea (2) is identical with it, the *kava* (*P. methysticum*) plant of the South Sea Islands.

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(1) "Iswestia" of the Imp. Russian Geographical Society for 1874, Vol. X., p. 83.

(2) *Keu* is the name of *P. methysticum* in the dialect of Bongu, but in the other dialect of the same coast it is called: *keuva*, *isse*, *kial*, *ayo*, *segu*, etc.

I wrote therefore to a friend of mine in Samoa and received from thence some leaves and fruits of the *P. methysticum*, which enabled Dr. Scheffer to make sure that the *keu* is the true *P. methysticum* of the Islands of the Pacific. (1)

All natives of the Maclay-Coast do not use the *keu*, in some villages this stimulant and its effect are known, but the use of it has not been adopted; in some others, it is not known at all. These facts makes me think, that the custom of drinking the *keu* has been introduced on the Maclay-Coast not very long ago (the natives however have no tradition about its introduction) and is still in the progressing stage.

The *keu* shrub is cultivated in the villages and on plantations, but I never heard that it grows wild at the Maclay-Coast.

I may add here an interesting fact, told me by Rev. W. G. Lawes in answer to my enquiries concerning the use of *P. methysticum* on the South-Coast of New Guinea. Mr. Lawes informed me, that as far his experience goes, the use of this stimulant is completely unknown to the natives of the South-Coast of New Guinea and the Louisiade Archipelago, but, that the plant (*P. methysticum*) is growing wild in many localities in the forest. The Rev. W. G. Lawes has been often told about it by missionary teachers, who being Polynesians (from Tonga, Samoa, and Tahiti), knew the *kava* plant well.

30. *Zingiber officinalis* (*Li*) is used as a dainty-dish after meals, mixed with ashes, the native substitute of salt (2) and as an *onim* (medicine).

31. *Cinnamomum sintoc* (*Muiu*). The bark is esteemed by the natives as an *onim*.

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(1) Annales du Jardin botanique de Buitenzorg. I., p. 51.

(2) Besides the sea-water ($\frac{1}{3}$ to $\frac{2}{3}$ of fresh water) which the natives use to cook their food, they have another substitute for salt—the ashes of logs of trees which after floating in the sea for months are cast up at high tides and which are collected, dried and burnt by the natives—the ashes procured in this way, has a saltish taste. This kind of salt is principally used by the hill natives who find it more convenient to carry logs than bamboos filled with salt water.

32. *Nicotiana tabacum* (*Kas*). The old natives of this Coast remember, that they were told by their fathers, that in their youth they (the fathers) were not acquainted with the use of tobacco and that the seeds and the knowledge of smoking have been introduced and have spread from village to village from the west. There are some villages in the mountains of the Maclay-Coast where the custom of smoking has not yet been introduced (1). The dried tobacco leaves are, before smoking, dried on a fire, after which they are torn, crushed and rolled in a leaf (2), also previously dried on fire, in the shape of a big cigarette and smoked. In some hill villages, the natives haves large bamboo pipes (3), which are filled with tobacco smoke from a cigarette and smoked by many people in turn, every one trying to inhale and to swallow as much of the cold smoke as he can. The use of the pipe has not been adopted by the coast natives, who prefer to smoke cigarettes.

III. PLANTS USEFUL IN DIFFERENT WAYS IN THE HOUSEHOLD OF THE NATIVES.

I will mention here some other plants, which are of importance in the every day life of the native of this part of new Guinea.

33. *Tauwi* (an Urticaceæ). The *mal* (4) of the men is manufactured just like the *tapa* of the Polynesians out of the bark of young Artocarpus trees, or the bark of the *Tauwi*.

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(1) The use of tobacco in the Louisiade Archipelago has also been introduced quite lately. I visited in 1880 some hill villages on the Island Basilaki (or Moresby Island) where the natives where completely unacquainted with tobacco and smoking.

(2) The natives of the Maclay-Coast use the leaves of several plants as covering for their cigarettes, I am sorry however to say, that I have neglected to ascertain which are these special plants.

(3) Just like on the South-Coast of New Guinea, where the use of tobacco, according to the authority of Rev. Lawes, has been introduced from the West and only lately has spread gradually to the S. East extremity of New Guinea and now the *kuku* (the native name for tobacco on the S.E. Coast) is in the greatest demand.

(4) The *mal* is a piece of tapa of more than three yards in length and about a ¼ of a yard wide. It is worn thus: one end is held fast near the navel, the *mal* passed between the legs and then carried several times round the waist and the end finally tied on the back.

34. *Abroma Augusta* (*Mal-Sel*) (1). The *mal* of women, consisting of a fringe more or less long, is made out of the fibres of the banana stem, or of the fibres of the *Mal-Sel.*

35. *Gnetum spec.* (*Tavan-Sel*). The *guns* (bags) are woven out of strings twisted of fibres of *Tavan-Sel.*

36. *Vitis spec.* (*Nug-Sel*). Very strong strings are twisted and sometimes plaited out of the *Nug-Sel* and of

37. *Boehmeria nivea* (*Den-Sel*) and of

38. *Rol-Sel,* which is the stem of a plant belonging to the Leguminosæ.

39. *Calamus spec.* (*Bu-Sel*). For anchor ropes and different riggings in native canoes (which are sometimes two masted), as well as for binding the parts of the framework of huts and fences the *Bu-Sel* is generally in use.

As material for baskets and mats, leaves of cocoanut, sago and other palms are used.

The sail of canoes is a large square mat made of Pandanus leaves.

Spears, bows, ends of arrows, etc , etc., are made out of the outer portion of the stem of the cocoanut and caryota palms.

40. *Canarium gutur* (n. spec.) (*Gutur*). (2) The *damar*-like resin, which trickles out from the trees of this species of Canarium is called by the natives also *Gutur* and is used by them principally as a binding material in the manufacture ot different implements.

41. *Calophyllum Inophyllum* (*Subary*). The boiled nuts are used as a kind of wash for the crisped hair of the natives after which operation (the subary-nut having made the wash oily) the kumu (3) sticks better to the hair. For the same purpose—hot, scraped pulp of old cocoa nut is also in use.

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(1) *Sel*—is the general name for string or rope.

(2) *Vide* Appendix, p. 357.

(3) The *kumu* or the black dye for body and hair of the natives of the Maclay-Coast is (after the analysis of Mr. R. Everwyn of the Mining Department in Batavia) Pyrolusite with a little oxide of iron.

PLANTS LATELY (SINCE 1871) INTRODUCED AT MACLAY-COAST.

Since my first arrival on this Coast in September 1871, some plants have been introduced by me at different times. I had the satisfaction of seeing in a small plantation round my house near Bongu, some of the introduced plants growing abundantly, as: different kinds of pumpkins, watermelon, indian corn, Carica papaya and many other plants, the seeds of which I brought with me (in 1871 from Tahiti and Java in 1876) (1). The natives were delighted to get the seeds and watched with the greatest interest the growth of the new plants. The papaya, the water melon and the indian corn became the favourites and were soon introduced in the plantations and the villages on the coast.

Numbers of natives from distant villages in the mountains came to pay me visits with the object of obtaining seeds from me.

On my last visits of the Maclay-Coast, in March 1883, I brought more seeds and seedlings (from Macassar and Amboina). There were inter alia, seed of the Mangustin (Garcinia), of the Durian, of the Orange, Lemon, Coffee, etc., etc. I distributed the seeds amongst the natives of the villages, Bongu, Bogati, Bili-Bili and of some hill villages, to whom I specially recommended the coffee seeds.

My next visit to the Maclay-Coast will show me the result of this last importation of useful plants, which, if it succeeds as the experiment of 1876, will prove to be a complete success.

Before I close, I will only add, that having the intention that this paper should be chiefly an addition to our knowledge of the Ethnology of New Guinea, I have given here *only* a list of the more important plants in the household of the natives of the coast, omitting some which are of quite secondary considerations to the natives, and which they use only as food in quite exceptional cases, when they have nothing better, as for instance, a species of Cycas, (from the stem of which they make a kind of sago) of a wild arrowroot, a species of Nephelium, etc., etc., etc. Some others (as for instance the Kapok-tree), I have not mentioned because the tree has no value (at present) to the natives.

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(1) I have somewhere a list of these seeds amongst my papers, but can not at this moment place my hand upon it.

APPENDIX.

EDIBLE FRUITS FROM THE MACLAY-COAST, NEW GUINEA.

BY BARON FERD. VON MUELLER, K.C.M.G., M.D., F.R.S., &c.

From notes and drawings furnished by my distinguished friend, I am able to add to his account of *Musa Maclayi*. It belongs to the series of species, which in *M. uranoscopos* has its longest known representative. The flower stalk is upright or but slightly curved; bracts are red-brownish; the flowers occur about eight together; the lobes of the calyx measure nearly an inch in length, the fruits are about three inches long, but hardly more than one inch broad, faintly angular; the seeds are irregular in shape and often compressed. This *Musa* occurs on swamps and along streams.

This seems an apt opportunity for referring to an allied species: *Musa Seemanni* of Fiji, from whence it was first recorded by Dr. Seemann as *M. uranoscopos* (Fl. Vit., 290.) Specimens kindly transmitted by the hon. J. B. Thurston, C.M.G., enable me to offer the following notes on the Fiji plant. Flower stalk erect, about four feet long and to four inches thick; the bracts imbricate, the longest measuring fully one foot; total fruit spike about 1½ feet long, forming fascicles moderately crowded on all sides; fruits ellipsoid-ovate, remarkably blunt, 3 to 4 inches long, when aged blackish-brown outside and shining, with three of the longitudinal angles more prominent; pulp very succulent, of not unpleasant taste, from brown-yellow to vitellinous in color; pericarp thinly coriaceous; ovules numerous, turbinate-discoid, reaching in the ripe fruit not to beyond one lines length, outside blackish-grey. This species differs from *Musa Hillii* already in having the fruit-fascicles far less crowded, and the berries much less angular, also not remarkably attenuated at the summit. *M. uranoscopos*, *M. Hillii* and *M. Maclayi* should be cultivated side by side, so that their respective characteristics could be carefully studied from the living plants. I am informed, that the last mentioned produces suckers.

Musa calosperma is as yet only temporarily named, as merely seeds have been obtained, so that even the generic position needs yet to be confirmed. These seeds came from Moresby Island; and the seeds are also used as ornament by the natives on the eastern and southern coast of New Guinea; but the fruits are not eatable. An only seed seen by me, had been taken from an ornamental string, and thus had lost its albumen and embryo; it is about half an inch long and broad; the testa is of bony hardness and comparatively thick; at one extremity it opens into an ample cavity which communicates by a seemingly natural narrow perforation, with the still wider and not very high central cavity, into the middle of which the cross-septum somewhat protrudes; on the other side of the central cavity a smaller separate hollow exist, which is connected with a slight external excavation. It has been deemed advisable to give at once some account of the remarkable structure of this seed, in order that speedy attention may be drawn to the desirability of tracing this perhaps not uncommon Papuan plant to its primeval habitation, for obtaining thus full material for specific elucidation also.

(*Leaves and flowers not obtained*).

"*Orlan*" *Pangium edule*, (Reinwardt). "This fruit is suspended in bags within forest localities till it becomes sour." Professor Miquel avers, that this tree is wide spread over the Sunda Islands and Moluccas, probably however through cultivation only; it is there known to the antochthones under various names, all however dissimilar to the Papuan one; the inner pulps separates in very angular masses, each of which invests a seed; the cotyledons are more or less flexuous. Fruit not dissimilar to that of Hydnocarpus heterophyllus.

"*Dim*," *Bassia Maclayana.* (F. v. Mueller). This has been designated in honor of the finder. A globular five-celled fruit of large size (measuring about five inches in diameter), which presents all the carpologic characteristics of the genus Bassia among Sapoteæ; the pulpy portion is copious and adheres firmly to the endocarpal plates; the seeds measure about 1½ inch in length and fully one in width; the testa is very thick, of long firmness and outside shiningly brown-black; the hilum is remarkably broad. When the flowers shall have been obtained, we will be able to judge, whether the tree yielding this very conspicuous fruit is perhaps to be counted with the species of the genus Lucuma, as now defined, no generic fruit-differences existing between Lucuma and Bassia; but the latter should change its name for *Illippe*, as already 1771 given by Koenig (Linné, mantissa altera 563) inasmuch as Allioni five years earlier fully established a genus Bassia among Salsolaceæ.

"*Nate.*" Bassia Cocco (Scheffer in Annales du jardin botanique de Buitenzorg, L 34.) The fruit is irregularly traversed by several longitudinal furrows. Dr. Scheffer (in 1876) also saw fruits only; hence the generic position of this tree remains still somewhat unsettled.

"*Gutur.*" Canarium, the species from the mere fruits undefinable. "A tree exuding a resin not unlike Damar." Only unripe fruits seen, which in that state are prominently triangular, hardly half as broad as long and somewhat pointed; the fruit-calyx spreads horizontally, and is only short-lobed. The seeds are eatable, (1) and are probably of the same almond-like taste as those of Canarium commune. Concerning the latter already Gaertner (de fructibus II., 99) observed, that even in very old fruits the seeds do not become rancid, although they are so very oily. He also noticed (as far back as 1791), that fruits of Canarium not rarely ripen three seeds, as remarked also recently by Engler (De Candolle, monogr. phanerog. IV., 101). Since now already more than half a hundred species of Canarium have become clearly defined merely from India (continental and insular), we may expect a considerable access still to the few recorded Papuan congeners.

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(1) I am *not* sure if the seeds are eaten or not. M.M.

"*Mogar.*" The pod of a leguminous plant resembling that of Psophocarpus tetragonolobus, and also that of Cassia alata. "A climber; the seeds edible." Fruit very prominently quadrangular; valves thinly coriaceous, pulp as well as septa none; seeds small in proportion to the width of the fruit, placed longitudinally, not provided with any elongated funicle, but supported by a short narrow strophiole; areole on each side wanting, albumen seemingly none; cotyledons (in hardly ripe seeds, such as come under notice here) straight.

CATALOGUE OF THE DESCRIBED COLEOPTERA OF AUSTRALIA.

By George Masters.

Part I.

CINCINDELIDÆ AND CARABIDÆ.

The large additions made to the Entomological Fauna of Australia since the publication of my last Catalogue of Coleoptera in 1872, and which was never completed, induces me to believe that the revised and complete Catalogue, of which I now lay before the Society the first part, will be found of great service to the Student of Entomology here, and not without interest to naturalists generally.

Family. CICINDELIDÆ.

Sub-Family. MEGACEPHALIDES.

MEGACEPHALA. Latreille.

1 CYLINDRICA Macleay. Trans. Ent. Soc., N. S. Wales, 1863 I., p. 11
Darling River, N. S. Wales; Peak Downs, &c., Queensland.
2 HOWITTI Casteln. Trans. Roy. Soc., Victoria, VIII., p. 31.
Cooper's Creek ; Central Australia.

TETRACHA. Hope.

3 AUSTRALASIÆ Hope. Proc. Ent. Soc., 1841, p. 45; Ann. Nat. Hist., 1842, IX., p. 425 ; White Stokes Voy. App. t, 1, f. 1 ; Thoms. Mon., p. 49.
North Australia.

4 Australis Chaud. Cat. Coll. Cic., 1865, p. 63.
Waterhousii Casteln. Trans. Roy. Soc., Victoria, VIII., p. 32.
Central Australia; Port Wakefield; S. Australia.

5 basalis Macleay. Proc. Ent. Soc., N. S. Wales, 1866, I., p. 58.
Port Denison; Queensland.

6 Bostocki Casteln. Trans. Roy. Soc., Victoria, VIII., p. 36.
Nickol Bay; W. Australia.

7 crucigera Macleay. Trans. Ent. Soc., N. S. Wales, 1863, I., p. 10.
Port Denison, Gayndah, Duringa, &c.; Queensland.

8 Hopei Casteln. Trans. Roy. Soc., Victoria, VIII., p. 37.
Nickol Bay; W. Australia.

9 humeralis Macleay. Trans. Ent. Soc., N. S. Wales, 1863, I., p. 9.
Port Denison, Cleveland Bay; Queensland.

10 pulchra Brown. Trans. Ent. Soc. Lond., 1869, p. 352.
Champion Bay; W. Australia.

11 scapularis Macleay. Trans. Ent. Soc., N. S. Wales, 1863, I., p. 10.
Port Denison; Queensland.

Sub-Family. CICINDELIDES.

CICINDELA. Linné

12 albicans Chaud. Bull. Mosc., 1854, I., p. 117.
Moreton Bay; Queensland.

13 circumcincta Casteln. Trans. Roy. Soc., Victoria, VIII., p. 34.
N. S. Wales, and Queensland (widely distributed.)

14 igneicollis H. W. Bates. Ent. Mon. Mag., 1874, X., p. 262.
Western Australia.

15 interrupta Fab. Syst. El., I., p. 243.
semicincta Chaud. Bull. Mosc., 1854, I., p. 117.
Moreton Bay; Queensland.

16 ioscelis Hope. Proc. Ent. Soc., 1841, p. 45; Ann. Nat. Hist., 1842, IX., p. 425.
Port Essington; N. Australia.

17 Macleayi Casteln. Trans. Roy. Soc. Victoria, VIII., p. 37.
Western Australia.

18 Mastersi Casteln. Trans. Roy. Soc. Victoria, VIII., p. 33.
N. S. Wales (widely distributed.)

19 nigrina Macleay. Trans. Ent. Soc., N. S. Wales, 1864, I, p. 107.
Port Denison; Queensland.

20 platycera Gestro. Ann. Mus. Genov., 1879, XIV., p. 553.
Cape York; N. Australia.

21 Rafflesia Chaud. Bull. Mosc., 1852, I., p. 13.
Montraveli Blanch. Voy. Pole. Sud., 1853, IV., p. 8, t. 1, f. 6.
Raffles Bay.

22 tetragramma Boisd. Voy. Astrol., II., p. 6.
Australia.

23 Wilcoxi Casteln. Trans. Roy. Soc., Victoria, VIII., p. 34.
Clarence River; N. S. Wales. Moreton Bay; Queensland.

24 ypsilon Dej. Spec, I., p. 126; Boisd. Voy. Astrol., II., p. 8; Macleay. Dej. Cat., 3, ed., p. 5.
Sea Coast of N. S. Wales. Victoria?

DISTYPSIDERA. Westwood.

25 flavicans Chaud. Bull. Mosc., 1854, I., p. 125.
cursitans Macleay. Trans. Ent. Soc., N. S. Wales, 1863, I., p. 12.
Northern parts of N. S. Wales, and Southern parts of Queensland.

26 Gruti Pascoe. Ann. Nat. Hist., 1862, p. 462.
Lizard Island; N. E. Coast.

27 interrupta Dokh. Rev. Mens. Ent., 1883, I., p. 7.
Cape York; N. Australia.

28 Mastersi Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 80.
Wide Bay, Gayndah; Queensland.

29 Plustchevskii Dokh. Rev. Mens. Ent., 1883, I., p. 7.
Cape York; N. Australia.

30 Strangei Casteln. Trans. Roy. Soc., Victoria, VIII., p. 33.
Australia.

31 undulata Westw. Mag. of Zool., I., p. 252, t. 7, f. 1.
Northern parts of N. S. Wales, and Southern parts of Queensland.

32 volitans Macleay. Trans. Ent. Soc., N. S. Wales, 1863, I., p. 11.
Port Denison, Cleveland Bay; Queensland.

Family. CARABIDÆ.

Sub-Family. CARABIDES.

CALOSOMA. Weber.

33 Australe Hope. Trans. Ent. Soc., 1845, IV., p. 104.
Cooper's Creek, Gayndah, Duringa, &c.; Queensland.

34 grandipenne Casteln. Trans. Roy. Soc., Victoria, VIII., p. 99.
Victoria.

35 Schayeri Erich. Wiegm. Arch., 1842, I., p. 122.
Curtisii Hope. Trans. Ent. Soc., 1845, IV., p. 104; Wilson. Proc. Ent. Soc., 1863, p. 182.
N. S. Wales, Queensland, Victoria, S. Australia, Tasmania.

Sub-Family. PAMBORIDES.

PAMBORUS. Latreille.

36 alternans Latr. Enc. Meth., VIII., p. 678; Dej. Spec., II., p. 19, Lacord. Gen. Atl., t. 2, f. 5.
elongatus Gory. Mon., t. 116, f. 2; Chaud. Rev. et Mag. de Zool., 1869.
N. S. Wales, and Southern parts of Queensland.

37 Brisbanensis Casteln. Trans. Roy. Soc., Victoria, VIII., p. 96.

Moreton Bay, Wide Bay, Port Curtis, Gayndah; Queensland.

38 GUERINII Gory. Mag. Zool., 1830, t. 26; Mon. t. 167, f. 2; Boisd. Voy. Astrol., II., p. 27.

Northern parts of N. S. Wales, and Southern parts of Queensland.

39 MACLEAYI Casteln. Trans. Roy. Soc., Victoria, VIII., p. 96.

Clarence River; N. S. Wales.

40 MORBILLOSUS Boisd. Voy. Astrol., 1835, II., p. 27; Guer. Mon. t. 167, f. 1.

Cunninghami Casteln. Etud. ent., 1835, p. 156; Chaud. Rev. et Mag. de Zool., January, 1869.

N. S. Wales.

41 PRADIERI Chaud. Rev. et Mag. de Zool., January, 1869.

North Australia.

42 VIRIDI-AUREUS Macleay. Proc. Linn. Soc., N. S. Wales, 1883, VIII., p. 409.

Moreton Bay; Queensland.

43 VIRIDIS Gory. Mon. t. 166, f. 1.

Northern parts of N. S. Wales; Southern parts of Queensland.

LACORDAIRIA. Castelnau.

44 ANCHOMENOIDES Casteln. Trans. Roy. Soc., Victoria, VIII., p. 98.

Mount Wellington; Tasmania.

45 ANGUSTATA Casteln. Trans. Roy. Soc., Victoria, VIII., p. 98.

Blue Mountains; N. S. Wales.

46 ARGUTOROIDES Casteln. Trans. Roy. Soc., Victoria, VIII., p. 98.

Yankee Jim Creek; Victoria.

47 CALATHOIDES Casteln. Trans. Roy. Soc., Victoria. VIII., p. 98.

Ouse River; Tasmania.

48 CYCHROIDES Casteln. Trans. Roy. Soc., Victoria, VIII., p. 97.

Clarence River, N. S. Wales; Brisbane; Queensland.

49 ERICHSONI Casteln. Trans. Roy. Soc., Victoria, VIII., p. 98.
Tasmania.
50 MARGINATA Casteln. Trans. Roy. Soc., Victoria, VIII., p. 98.
Yarra River; Victoria.
51 PROXIMA Casteln. Trans. Roy. Soc., Victoria, VIII., p. 98.
Yankee Jim Creek; Victoria.

Sub-Family. ODACANTHIDES.

OPHIONEA. Eschscholtz.

52 THOUZETI Casteln. Trans. Roy. Soc., Victoria, VIII., p. 100.
Rockhampton; Queensland.

CASNONIA. Latreille.

53 ALIENA Pascoe. Journ. of Ent., 1860, I., p. 39.
Moreton Bay; Queensland.
54 AMPLIPENNIS Gestro. Ann. Mus. Genov., 1875, VII., p. 853.
Swan River; W. Australia.
55 AUSTRALIS Chaud. Bull. Mosc., 1862, IV., p. 227.
Australia.
56 CLARENSII Casteln. Trans. Roy. Soc. Victoria, VIII., p. 100.
Clarence River; N. S. Wales.
57 MICANS Macleay. Trans. Ent. Soc. N. S. Wales, 1864, I., p. 107; Casteln. Trans. Roy. Soc. Victoria, VIII., p. 100.
Port Denison; Queensland.
58 OBSCURA Casteln. Trans. Roy. Soc. Victoria, VIII., p. 100.
Rockhampton, Gayndah; Queensland.

ANASIS. Castelnau.

59 HOWITTII Casteln. Trans. Roy. Soc. Victoria, VIII., p. 101.
Geelong; Victoria.

EUDALIA. Castelnau.

60 LATIPENNIS Macleay. Trans. Ent. Soc. N. S. Wales, 1864, I., p. 108; Casteln. Trans. Roy. Soc. Victoria, VIII., p. 101.
Port Denison, Gayndah; Queensland.

61 **Macleayi** Bates. Ent. Month. Mag., 1871, VIII., p. 32.
Monaro; N. S. Wales.

62 **Waterhousei** Casteln. Trans. Roy. Soc. Victoria, VIII., p. 102.
Arnheim's Land; N. Australia.

Sub-Family. GALERITIDES.

DRYPTA. Fabricius.

63 **Australis** Dej. Spec. I., p. 185; Macleay, Dej. Cat., 3 ed., p. 8.
N. S. Wales; Queensland.

64 **connecta** Chaud. Bull. Mosc., 1877, LII., pt. I., p. 260.
Clarence River; N. S. Wales.

65 **Mastersi** Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 82.
Gayndah; Queensland.

DENDROCELLUS. Schmidt, Goebel.

66 **smaragdinus** Chaud. Bull. Mosc., 1861, II., p. 545; Casteln. Trans. Roy. Soc., Victoria, VIII., p. 102.
Rockhampton; Queensland.

POLYSTICHUS. Bonelli.

67 **Australis** Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 82.
Gayndah, Rockhampton; Queensland.

ZUPHIUM. Latreille.

68 **Australe** Chaud. Bull. Mosc., 1862, IV., p. 312.
Melbourne; Victoria.

69 **Castelnaui** Gestro. Ann. Mus. Genov., 1875, VII., p. 865.
Sydney; N. S. Wales.

70 **Mastersi** Casteln. Trans. Roy. Soc., Victoria, VIII., p. 103.
Rope's Creek; N. S. Wales.

71 **Rockhamptonense** Casteln. Trans. Roy. Soc., Victoria, p. 103.
Rockampton; Queensland.

72 Thouzeti Casteln. Trans. Roy. Soc., Victoria, VIII., p. 103.
Rockampton, Port Denison; Queensland.

ZUPHIOSOMA. Castelnau.

73 fulva Casteln. Trans. Roy. Soc., Victoria, VIII., p. 103.
Singleton; N. S. Wales; Rockampton; Queensland.

Sub-Family. HELLUONIDES.

ÆNIGMA. Newman.

74 Iris Newm. Ent. Mag., III., p. 499.
N. S. Wales. Queensland.
75 Newmani Casteln. Trans. Roy. Soc., Victoria, VIII., p. 108.
Neighbourhood of Sydney; N. S. Wales.
76 parvulum Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 323.
Clarence River; N. S. Wales.
77 splendens Casteln. Tans. Roy. Soc., Victoria, VIII., p. 109.
Port Denison; Queensland.

GIGADEMA. Thomson.

78 Bostocki Casteln. Trans. Roy. Soc., Victoria, VIII., p. 107.
Northern parts of Western Australia.
79 Damelii Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 323.
Cape York; North Australia.
80 grande Macleay. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 108.
Port Denison, Cleveland Bay, &c.; Queensland.
81 intermedia Gestro. Ann. Mus. Genov., 1875, VII., p. 877.
Lachlan River; N. S. Wales.
82 longipenne Germ. Linn. Ent., 1848, III., p. 162.
South Australia.
83 minutum Casteln. Trans. Roy. Soc., Victoria, VIII., p. 108.
Ipswich, Port Denison, &c.; Queensland.

84 NOCTIS Newm. The Entomol, 1842.
titanum Thoms. Arc. Ent., 1859, p. 93, t. 5, f. 7-8.
Clarence River, N. S. Wales. Port Denison; Queensland.

85 PAROENSE Casteln. Trans. Roy. Soc., Victoria, VIII., p. 107.
Paroo River; Central Australia.

86 POLITULUM Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 83.
Gayndah; Queensland.

87 SULCATUM Macleay. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 108.
Thomsoni Casteln. Trans. Roy. Soc., Victoria, VIII., p. 108.
Port Denison, Gayndah, &c.; Queensland.

88 UNICOLOR Hope. Proc. Ent. Soc., 1842, p. 47; Ann. Nat Hist., 1842, IV., p. 426.
Port Essington; N. Australia.

HELLUOSOMA. Castelnau.

89 ATERRIMUM Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 323.
Cape York; N. Australia.

90 ATRUM Casteln. Trans. Roy. Soc., Victoria, VIII., p. 108.
Rockhampton; Queensland.

91 CYANEUM Casteln. Trans. Roy. Soc., Victoria, VIII., p. 109.
Northern parts of N. S. Wales, and Southern parts of Queensland.

92 CYANIPENNE Hope. Proc. Ent. Soc., 1842, p. 46; Ann. Nat. Hist,, 1842, IX., p. 426; Casteln. Trans. Roy. Soc., Victoria, VIII., p. 109.
Port Denison, Rockhampton, &c.; Queensland.

93 MASTERSI Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 83.
Gayndah; Queensland.

94 RESPLENDENS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 109.
Port Denison; Queensland.

ACROGENYS. Macleay.

95 HIRSUTA Macleay. Trans. Ent. Soc, N. S. Wales, 1864, I., p. 109.
Southern parts of Queensland.

96 LONGICOLLIS Gestro. Ann. Mus. Genov., 1875, VII., p. 859.
Queensland, W. Australia. ? ?

PSEUDOHELLUO. Castelnau.

97 WILSONI Casteln. Trans. Roy. Soc., Victoria, VIII., p. 105.
Brisbane; Queensland.

HELLUO. Bonelli.

98 CARINATUS Chaud. Bull. Mosc., 1848, I., p. 70.
Victoria.

99 COSTATUS Bon. Mem. Ac. Turin, 1813, p. 455; Klug. Jahrb., I., p. 75; Guér. Jc. régn. anim. Ins., t. 4, f. 8.
N. S. Wales.

HELLUODEMA. Casteln.

100 BATESI Thoms. Arch. Ent., 1857, p. 134; Casteln. Trans. Roy. Soc., Victoria, VIII., p. 109.
Clarence River, N. S. Wales; Brisbane, Queensland.

Sub-Family. BRACHINIDES.

PHEROPSOPHUS. Solier.

101 AUSTRALIS Casteln. Trans. Roy. Soc., Victoria, VIII. p. 109.
Rockampton; Queensland.

102 VERTICALIS Dej. Spec., I, p. 302.
Jamisoni Macleay. Dej. Cat., 3 ed., p. 13.
Australia (widely distributed.)

Sub-Family. CALLIDIDES.

TRIGONOTHOPS. Macleay.

103 DIMIDIATA Chaud. Bull. Mosc., 1877, LII., pt. 1, p. 222.
South Australia.

104 FLAVOFASCIATA Chaud. Bull. Mosc., 1877, LII., pt. 1, p. 223.
South Australia.

105 LINEATA Dej. Sp. Gen. Col., 1831, V., p. 343.
Callida lineata Dej.
Kangaroo Island; S. Australia.

106 LONGIPLAGA Chaud. Bull. Mosc., 1877, LII., pt. 1, p. 222.
Melbourne; Victoria.

107 NIGRICOLLIS Macleay. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 111.
Rockhampton, Port Denison, &c.; Queensland.

108 PACIFICA Erichs. Wiegm. Arch., 1842, I., p. 124.
Callida pacifica Erichs.
Tasmania.

109 PALLIDICOLLIS Macleay. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 110.
Rockhampton, Port Denison, Gayndah, &c.; Queensland.

110 PLAGIATA Germ. Linn. Ent., 1848, III., p. 165.
Lebia plagiata Germ.
South Australia.

CYMINDIS. Latreille.

111 ÆNEA Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 320.
Monaro, N. S. Wales.

112 CRASSICEPS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 84.
Moreton Bay, Gayndah; Queensland.

113 ILLAWARRÆ Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 320.
Illawarra; N. S. Wales.

XANTHOPHÆA. Chaudoir.

114 ANGUSTICOLLIS Macleay. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 112.
Cymindis angusticollis. Macleay.
Port Denison; Queensland.

115 ANGUSTULA Chaud. Ann. Ent. Belg., 1872, XV., p. 189.
Melbourne ; Victoria.

116 CHAUDOIRI Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 84.
Gayndah ; Queensland.

117 FERRUGINEA Chaud. Ann. Ent Belg., 1872, XV., p. 193.
North Australia.

118 GRANDIS Chaud. Bull. Mosc., 1848, I. p. 75,
New South Wales, and Victoria. (Widely distributed).

119 INFUSCATA Chaud. Ann. Ent. Belg., 1872, XV., p. 188.
Tasmania.

120 LINEOLATA Chaud. Ann. Ent. Belg., 1872, XV., p. 194.
North Australia.

121 LISSODERA Chaud. Ann. Ent. Belg., 1872, XV., p. 191.
S. W. Australia.

122 LONGICOLLIS Macleay. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 111.
Cymindis longicollis Macleay.
Port Denison ; Queensland.

123 PARALLELA Chaud. Ann. Ent. Belg., 1872, XV., p. 192.
Cape York ; N. Australia.

124 PICIPENNIS Chaud. Ann. Ent. Belg., 1872, XV., p. 190.
South Australia.

125 PILOSULA Chaud. Ann. Ent. Belg., 1872, XV., p. 189.
Melbourne ; Victoria.

126 SUTURATA Newm. Entomol., 1842, p. 367.
Victoria.

127 VITTATA Dej. Sp. Gen. Col., 1831, V., p. 344, supp.
Melbourne ; Victoria.

PHLŒOCARABUS. Macleay.

128 MASTERSI Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 85.
Gayndah; Queensland.

DIABATICUS. H. W. Bates.

129 AUSTRALIS Erich. Wiegm. Arch., 1842, I., p. 124; Bates, Cist. Ent., 1878, II., p. 324.
Plochionus Australis Erich.
Tasmania ?

NOTOTARUS. Chaudoir.

130 AUSTRALIS Chaud. Bull. Mosc., 1875, XLIX., pt. 2, p. 19.
W. Australia.

ANOMOTARUS. Chaudoir.

131 OLIVACEUS Chaud. Bull. Mosc., 1875, XLIX., pt. 2, p. 48.
Melbourne; Victoria.

Sub-Family. DROMIIDES.

HOMOTHES. Newman.

132 ELEGANS Newm. Entomol., 1842, p. 402.
sericeus Erich. Wiegm. Arch., 1842, I., p, 131; Lacord. Gen. Col., I., p. 119.
Victoria and Tasmania.

133 EMARGINATUS Chaud. Bull, Mosc., 1872, XLV., p. 389.
Melbourne; Victoria.

134 GUTTIFER Germ. Linn. Ent., 1848, III., p. 166.
Tasmania, S. Australia, Victoria.

135 MARGINIPENNIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 89.
Gayndah; Queensland.

136 MICANS Germ. Linn. Ent., 1848, III., p. 167.
S. Australia, Victoria, N. S. Wales.

137 VELUTINUS Macleay. Trans. Ent. Soc. N. S. Wales, 1871, II., p. 88.
Gayndah; Queensland.

DEMETRIAS. Bonelli.

138 BRACHINODERUS Chaud. Bull. Mosc., 1852, I. p. 46.
Melbourne; Victoria.

DROMIUS. Bonelli.

139 CRUDELIS Newm. Entomol., p. 37.
Kangaroo Island; S. Australia.

140 HUMERALIS Macleay. Trans. Ent. Soc. N. S. Wales, 1871, II., p. 88.
Gayndah; Queensland.

141 TRIDENS Newm. Entomol., p. 38.
Kangaroo Island; S. Australia.

Sub-Family. LEBIIDES.

PHLŒODROMIUS. Macleay.

142 PICEUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 86.
Gayndah; Queensland.

PENTAGONICA. Schmidt-Goebel

143 VITTIPENNIS Chaud. Bull. Mosc., 1877, LII., pt. 1, p. 217.
Australia.

PERIGONA. Castelnau.

144 BASALIS Putz. Ann. Mus. Genov., 1873, IV., p. 223.
Queensland.

LACHNODERMA. Macleay.

145 CINCTUM Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 321.
Clarence River; N. S. Wales.

EULEBIA. Macleay.

146 PLAGIATA Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 87.
Lebia melanota Chaud. Bull. Mosc., 1871, p. 226.
Gayndah; Queensland.

147 PICIPENNIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 87.
Gayndah; Queensland.

SAROTHROCREPIS. Chaudoir.

148 BENIFICA Newm. Entomol, 1842, p. 367.
Lebia benefica Newm.
Victoria ; S. Australia.
149 CALIDA Newm. Entomol, 1842, p. 367.
Lebia calida Newm.
Victoria,
150 CIVICA Newm. Entomol, p. 31.
Lebia civica Newm.
N. S. Wales, Victoria, S. Australia, Tasmania.
151 CORTICALIS Fab. Syst. El., I., p. 201.
Tasmania, Victoria.
152 DUPONTI Putz. Mem. Liege, 1846, II., p. 393.
Tasmania, S. Australia, Victoria.
153 FASCIATA Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 88.
Gayndah ; Queensland.
154 LUCTUOSA Newm. Entomol, 1842, p. 368.
Lebia luctuosa Newm.
Bowenfells, and Monaro; N. S. Wales. Tasmania. Victoria
155 MASTERSI Macleay. Trans. Ent. Soc., N. S. Wales, 1871 II., p. 87.
Gayndah ; Queensland.
156 PALLIDA Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 87.
Gayndah ; Queensland.
157 POSTICALIS Guér. Voy. Coquille., p. 58, t. 1, f. 8.

Sub-Family. COPTODERIDES.

PHILOPHLŒUS. Chaudoir.

158 ANGULATUS Chaud. Ann. Soc. Ent. Belg., XII., p. 219.
Melbourne ; Victoria.
159 AUSTRALASIÆ Chaud. Ann. Soc. Ent. Belg., XII., p. 217.
Victoria.

160 Australis Dej. Spec. II., p, 449; Guér. Voy. Coquille, t. 1, f. 8; Blanch, Voy. Pole. Sud., p. 12; d'Urville Dej. Cat., 3 ed., p. 9.
Cymindis Australis Dej.
N. S. Wales; Victoria.

161 brunnipennis Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 89.
Gayndah; Queensland.

162 distinguendus Chaud. Ann. Soc. Ent. Belg., XII., p. 225,
Monaro, &c.; N. S. Wales.

163 dubius Macleay. Trans. Ent. Soc., N. S. Wales, 1871, p. 90.
Gayndah; Queenland.

164 Eucalypti Germ. Linn. Ent., 1848, III., p. 164.
South Australia.

165 fuscipennis Germ. Linn. Ent., 1848, III., p. 164.
South Australia.

166 grandiceps Chaud. Ann. Soc. Ent. Belg., XII., p. 216.
South Australia.

167 immaculatus Chaud. Ann. Soc. Ent. Belg., XII., p. 17.
Victoria.

168 intermedius Chaud. Ann Soc. Ent. Belg., XII., p. 216.
South Australia; Victoria.

169 irrita Newm. Entomol., 1842, p. 370.
Lebia irrita Newm.

170 luculentus Newm. Entomol., 1842, p. 368.
Lebia luculenta Newm.
N. S. Wales. Victoria.

171 maculatus Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 89.
Gayndah; Queensland.

172 mollis Newn. Entomol., 1842, p. 370; Chaud. Ann. Soc. Ent. Belg., XII., p. 222.
Victoria.

173 obtusus Chaud. Ann. Soc. Ent. Belg., XII., p. 219.
N. S. Wales.

174 PLANUS Newm. Entomol., p. 33; Chaud. Ann. Soc. Ent. Belg., XII., p. 220.
Lebia plana Newm.
South Australia. Cooper's Creek; Queensland.

175 PUBERULUS Chaud. Ann. Soc. Ent. Belg., XII., p. 218.
Victoria. Mittagong; N. S. Wales.

176 QUADRIPENNIS Chaud. Ann. Soc. Ent. Belg., XII., p. 218.
Australia.

177 RECTANGULUS Chaud. Ann. Soc. Ent. Belg., XII , 222.
N. S. Wales.

178 UNICOLOR Chaud. Ann. Soc. Ent. Belg., XII., p. 220.
Gayndah; and interior of Australia

179 VITTATUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 90.
Gayndah; Queensland.

AGONOCHILA. Chaudoir.

180 ANOMALA Chaud. Ann. Soc. Ent. Belg., XII., p. 223.
Melbourne.

181 BIGUTTATA Chaud. Ann. Soc. Ent. Belg., XII., p. 225.
N. S. Wales. Victoria.

182 BINOTATA White. Voy. Ereb. Terr., 1846, p. 2; Blanch. Voy. Pole. Sud., p. 12, t. 1, f. 8.
Australia.

183 CORTICALIS Chaud. Ann. Soc. Ent. Belg., XII., p. 226.
Melbourne; Victoria.

184 CRIBRIPENNIS Chaud. Ann. Soc. Ent. Belg., XII., p. 230.
Melbourne; Victoria.

185 GUTTATA, Chaud. Bull. Mosc., 1848, I., p. 119.
Melbourne; Victoria.

186 LITTERA V. Chaud. Ann. Soc. Ent. Belg., XII., p. 227.
Australia.

187 LUTOSA Newm. Entomol, p. 32.
Lebia lutosa Newm.
Thyreopterus subangulatus Germ. Linn. Ent., 1848, III., p. 166.
South Australia.

188 MINIMA Macleay. Trans. Ent. Soc., N. S. Wales, 1854, I., p. 111. ; Trans. Ent. Soc., N. S. Wales, 1871, II., p. 88.
Sarothrocrepis minima Macleay.
Port Denison, Gayndah, &c. ; Queensland.

189 SINUOSA Chaud. Ann. Soc. Ent. Belg., XII., p. 228.
Moreton Bay ; Queensland.

190 SUBFASCIATA Chaud. Ann. Soc, Ent. Belg., XII., p. 228.
Adelaide ; S. Australia.

191 SUBLÆVIS Chaud. Ann. Soc. Ent. Belg., XII., p. 224.
Australian Alps.

192 SUTURALIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 91.
Gayndah ; Queensland.

193 VITTULA Chaud. Ann. Soc. Ent. Belg., XII., p. 229.
Melbourne ; Victoria.

IDIUS. Chaudoir.

194 MŒSTUS Chaud. Ann. Soc. Ent. Belg., XII., p. 212.
Melbourne ; Victoria.

EUCALYPTOCOLA. Macleay.

195 MASTERSI Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 91.
Gayndah, Queensland ; Clarence River, N. S. Wales.

Sub-Family. THYREOPTERIDES.

COPTOGLOSSUS. Chaudoir.

196 SULCATULUS Chaud. Ann. Ent. Belg., XII., p. 125.
Melbourne ; Victoria.

ECTINOCHILA. Chaudoir.

197 TESSELLATA Chaud. Col. Nov., 1883, I., p. 21.
Moreton Bay ; Queensland.

CATASCOPUS. Kirby.

198 AUSTRALASIÆ Hope. Ann. Nat. Hist., 1842, IX., p. 426.
Port Essington ; N. Australia.

199 CHAUDOIRI Casteln. Proc. Roy. Soc., Victoria, 1867, p. 24.
Northern parts of N. S. Wales.

200 LATICOLLIS Macleay. Proc. Linn. Soc., N. S. Wales, 1883, VIII., p. 410.
North Australia.

201 UNICOLOR Hope. Ann. Nat. Hist., 1842, IX., p. 426.
Australia.

SCOPODES. Erichson.

202 ÆNEUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 91.
Gayndah, Queensland.

203 ANGULICOLLIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, p. 92.
Gayndah ; Queensland.

204 ATERRIMUS Chaud. Bull, Mosc., 1872, XLV., I, p. 391.
Sydney, N. S. Wales ; S. Australia ?

205 AURATUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 92.
Gayndah ; Queensland.

206 BOOPS Erichs. Weigm. Arch. 1842, I., p. 124, t. 4, f. 1 ; Lacord. Gen. Alt., I., t. 4, f. 5.
sexpunctatus Newn. The Entomol., p. 413.
Tasmania.

207 DENTICOLLIS Macleay. Trans. Ent., Soc., N. S. Wales, 1864, I., p. 112.
Port Denison ; Queensland.

208 LÆVIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871., p. 92.
Gayndah ; Queensland.

209 SERICEUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 93.
Gayndah ; Queensland.

210 SIGILLATUS Germ. Linn. Ent., 1848, III., p. 163.
South Australia ; Victoria.

211 TASMANICUS H. W. Bates. Cist. Ent., 1878, II., p. 324.
Tasmania.

212 TRIPUNCTATUS Chaud. Bull. Mosc., 1852, I., p. 64.
Australia.

Sub-Family. PSEUDOMORPHIDES.

SILPHOMORPHA. Westwood.

213 ALBOPICTA Newm. Zoolog., Append. p. 124.
Australia.

214 AMABILIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 112.
Port Denison, &c.; Queensland.

215 BICOLOR Casteln. Trans. Roy. Soc., Victoria, VIII., p. 112.
Rockhampton, Gayndah, Port Denison, &c.; Queensland.

216 BIMACULATA Casteln. Trans. Roy. Soc., Victoria, VIII., p. 113.
Rockhampton; Queensland.

217 BIPLAGIATA Casteln. Trans. Roy. Soc., Victoria, VIII., p. 113.
Brisbane, Gayndah, &c.; Queensland.

218 BRISBANENSIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 114.
Northern parts of N. S. Wales and Southern parts of Queensland.

219 CASTELNAUI Reiche. Col. Heft., III., 1868.
marginata Casteln. Trans. Roy. Soc., Victoria, VIII., p. 112.
N. S. Wales. Victoria.

220 COLYMBETOIDES Westw. Mon., p. 403, t. 14, f. 19.
N. S. Wales. Victoria.

221 DECIPIENS Westw. Trans. Linn. Soc., 1840, p. 415, t. 28, f. 3; Mon., t. 14, f. 5.
N. S. Wales. Victoria. Queensland.

222 DENISONENSIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 115.
Port Denison; Queensland.

223 DISCOIDALIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 113.
Murray River; Victoria.

224 DUBIA Casteln. Trans. Roy. Soc., Victoria, VIII., p. 116.
N. S. Wales.

225 FALLAX Westw. Trans. Linn. Soc., 1840, p. 416, t. 28, f. 4; Mon., t. 14, f. 2; Lacord. Gen. Atl., I., t. 5, f. 3.
orectochiloides Hope. Trans. Ent. Soc., 1845, IV., 2, p. 104.
N. S. Wales. Victoria. S. Australia.

226 GRANDIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 114.
Port Denison; Queensland.

227 GUTTIFERA Casteln. Trans. Roy. Soc., Victoria, VIII., p. 114.
Port Denison; Queensland.

228 GUTTIGERA Newm. Entomol., 1842, p. 365.
N. S. Wales; Victoria.

229 HYDROPOROIDES Westw. Mon., p. 401, t. 14, f, 7.
Australia. (Widely distributed.)

230 LÆVIGATA Casteln. Trans. Roy. Soc., Victoria, VIII., p. 116.
Victoria.

231 LÆVIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 116.
Port Denison; Queensland.

232 MACULATA Newm. Ann. Nat. Hist., IV., p. 365; Westw. Mon., t. 14, f. 8.
N. S. Wales; Victoria; S. Australia.

233 MACULIGERA Macleay. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 113.
Port Denison; Gayndah, &c., Queensland.

234 MARGINATA Casteln. Trans. Roy. Soc., Victoria, VIII., p. 112.
Paroo River, Queensland.

235 MASTERSI Macleay. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 112.
Port Denison; Queensland.

236 NITIDULOIDES Guér. Mag. Zool., 1844, p. 140; Westw. Mon., t, 14, f. 9.
cinctipennis Westw. olim.
N. S. Wales: Victoria.

237 OCCIDENTALIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 114.
Swan River; W. Australia.

238 OVALIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 116.
Pine Mountain; Queensland.

239 PICTA Casteln. Trans. Roy. Soc., Victoria, VIII., p. 111.
Southern parts of Queensland.

240 POLITA Macleay. Trans. Ent. Soc., N. S. Wales, 1871, p. 93.
Gayndah ; Queensland.

241 QUADRIMACULATA Macleay. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 113.
Port Denison ; Gayndah, &c., Queensland.

242 QUADRISIGNATA Casteln. Trans. Roy. Soc., Victoria, VIII., p. 112.
Victoria. S. Australia.

243 ROCKHAMPTONENSIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 114.
Rockhampton ; Queensland.

244 RUFOMARGINATA Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 94.
Gayndah ; Queensland.

245 SEMISTRIATA Casteln. Trans. Roy. Soc., Victoria, VIII., p. 116.
Port Denison ; Queensland.

246 SPECIOSA Pascoe. Journ. of Ent., 1863, II., p. 26
Port Denison, Gayndah, &c.; Queensland.

247 STRIATA Casteln. Trans. Roy. Soc., Victoria, VIII., p. 115.
N. S. Wales.

248 SUTURALIS Germ. Linn. Ent., 1848, p. 171 ; Westw. Mon., t. 14, f. 6 ; Lacord. Gen. Atl., I., t. 5, f. 2.
N. S. Wales. Victoria. S. Australia.

249 TASMANICA Casteln. Trans. Roy. Soc., Victoria, VIII., p. 115.
Tasmania.

250 THOUZETI Casteln. Trans. Roy. Soc., Victoria, VIII., p. 113.
Rockhampton ; Queensland.

251 VICINA Casteln. Trans. Roy. Soc., Victoria, VIII., p. 1 5.
Southern parts of Queensland.

ADELOTOPUS. Hope.

252 AFFINIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 119.
Sydney ; N. S. Wales.

253 ANALIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 95.
Gayndah; Queensland.

254 APHODIOIDES Westw. Mon., p. 404.
Australia.

255 APICALIS Macleay. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 113.
Port Denison; Queensland.

256 BICOLOR Casteln. Trans. Roy. Soc., Victoria, VIII., p. 120.
Loddon River; Victoria.

257 BIMACULATUS Macleay. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 113.
Port Denison, Wide Bay, Gayndah, &c.; Queensland.

258 BRUNNEUS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 119.
Swan River; W. Australia.

259 CASTANEUS Casteln. Trans. Roy. Soc., Victoria, VIII., p 120.
Swan River; W. Australia.

260 CORNUTUS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 118.
Arnheim's Land; N. Australia.

261 CYLINDRICUS Chaud. Rev. Zool., 1862, p. 490.
Melbourne; Victoria.

262 DYTISCOIDES Newm. The Entomol., p. 365; Westw. Mon., t. 14, f. 2; Lacord. Gen. Alt., I., t. 5, f. 4.
Fortnumi Hope. Trans. Ent. Soc., 1845, IV.. p. 105.
South Australia.

263 EPHIPPIATUS Newm. Trans, Ent. Soc., 1856, p. 127.
Australia.

264 FASCIATUS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 118.
Sydney, N. S. Wales.

265 FILIFORMIS Casteln. Trans. Roy. Soc., Victoria, VIII., p.120.
Victoria. S. Australia.

266 GYRINOIDES Hope. Trans. Ent. Soc., 1834, I., p. 12, t. 1, f. 1; Westw. Mon., t. 14, f. 1.
South Australia.

267 hœmorrhoidalis Erich. Wiegm. Arch., 1842, I., p. 126; Westw. Mon., t. 14, f. 3.
var. *inquinatus* Newm. The Entomol, p. 366.
Tasmania. S. Australia.

268 hydrobioides West. Mon. p. 406.
Australia.

269 ipsoides Westw. Trans. Linn. Soc., XVIII., p. 413, t. 20, f. 2.
Australia.

270 maculipennis Macleay. Trans, Ent. Soc., N. S. Wales, 1871, II., p. 95.
Gayndah, Queensland.

271 Mastersi Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 94.
Gayndah, Queensland.

272 nemosomoides Westw. Mon., p. 408, t. 14, f. 4.
Australia.

273 obscurus Casteln. Trans. Roy. Soc., Victoria, VIII., p. 120.
Sydney, N. S. Wales.

274 occidentalis Casteln. Trans. Roy. Soc., Victoria, VIII., p. 118.
Swan River; W. Australia.

275 Parroensis Casteln. Trans. Roy. Soc., Victoria, VIII., p. 118.
Paroo, and Darling Rivers.

276 politus Casteln. Trans. Roy. Soc., Victoria, VIII., p. 188.
Clarence River, N. S. Wales; Brisbane: Queensland.

277 punctatus Casteln. Trans. Roy. Soc., Victoria, VIII., p. 118.
Clarence River, N. S. Wales.

278 rubiginosus Newm. Trans. Ent. Soc., 1856, p. 128.
Australia.

379 scolytides Newm. The Entomol., 1842, p. 366.
Australia.

280 sub-opacus Macleay. Trans. Ent. Soc., N. S. Wales; 1871, II., p. 94.
Gayndah; Queensland.

281 vicinus Casteln. Trans. Roy. Soc., Victoria, VIII., p. 117.
Sydney; N. S. Wales.

282 **ZONATUS** Casteln. Trans. Roy. Soc., Victoria, VIII., 119.
Melbourne; Victoria.

Sub-Family. OZENIDES.

MYSTROPOMUS. Chaudoir.

283 **CHAUDOIRI** Casteln. Trans. Roy. Soc., Victoria, VIII., p. 120.
Northern parts of N. S. Wales.

284 **SUBCOSTATUS** Chaud. Bull. Mosc., 1848, I., p. 109; 1854, II., p. 290: Lacord. Gen. Alt., t. 5, f. 5.
N. S. Wales (widely distributed), Pine Mountain; Queensland.

Sub-Family. DITOMIDES.

APOTOMUS. Illiger.

285 **AUSTRALIS** Casteln. Trans. Roy. Soc., Victoria, VIII., p. 121.
Melbourne, Victoria.

286 **MASTERSI** Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 95.
Gayndah, Queensland.

287 **NOVÆ HOLLANDIÆ** Casteln. Trans. Roy. Soc., Victoria, VIII., p. 121.
Rockhampton, Queensland.

Sub-Family. MORIONIDES.

HYPERION. Castelnau.

288 **SCHRŒTTERI** Schreib. Trans. Linn. Soc., VI., p. 201, t. 19, f. 15-19; t. 21, f. 10; Casteln., Hist. Nat., I., p. 69, t. 5, f. 1; Westw. Arc. Ent., I., p. 89., t. 23, f. 4.
Campylocnemis Schrœtteri Schreib.
N. S. Wales; Victoria; Queensland.

MORIO. Latreille.

289 **AUSTRALASIÆ** Chaud. Rev. Mag. Zool., January, 1869.
Moreton Bay, Queensland.

290 AUSTRALIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 122.
N. S. Wales.

291 LONGICOLLIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 95.
Gayndah, Queensland.

292 NOVÆ-HOLLANDIÆ Casteln. Trans. Roy. Soc., Victoria, VIII., p. 122.
Brisbane, Queensland.

293 PACHYSOMUS Chaud. Bull. Mosc., 1880, LV., p. 358.
North Australia.

294 PICEUS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 122.
Mount Macedon; Victoria.

295 SETICOLLIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 96.
Gayndah, Queensland.

296 VICTORIÆ Casteln. Trans. Roy. Soc., Victoria, VIII., p. 122.
Victoria.

MORIODEMA. Castelnau.

297 M'COYEI Casteln. Trans. Roy. Soc., Victoria, VIII., p. 125.
Melbourne; Victoria.

298 PARRAMATTENSIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 125.
Sydney, Parramatta, Ropes Creek, &c., N. S. Wales.

VERADIA. Castelnau.

299 BRISBANENSIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 126.
Brisbane, Gayndah, &c., Queensland.

SETALIS. Castelnau.

300 NIGER Casteln. Trans. Roy. Soc., Victoria, VIII., p. 126.
Clarence River, N. S. Wales; Brisbane, Gayndah, Queensland.

SILTOPIA. Castelnau.

301 TRICOLOR Casteln. Trans. Roy. Soc., Victoria, VIII., p. 127.
Parramatta, Clarence River, &c., N. S. Wales.

TERAPHIS. Castelnau.

302 ARGUTOROIDES Casteln. Trans. Roy. Soc., Victoria, VIII., p. 128.
Kiama ; N. S. Wales.

303 ELONGATA Casteln. Trans. Roy. Soc., Victoria, VIII., p. 128.
Mountains of Victoria.

304 MELBOURNENSIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 128.
Dandenong Ranges ; Victoria.

CELANIDA. Castelnau.

305 MONTANA Casteln. Trans. Roy. Soc., Victoria, VIII., p. 123.
Mountains of Victoria.

MELISODERA. Westwood.

306 PICIPENNIS Westw. Mag. Zool., 1835, IX., t. 132.
N. S. Wales.

SCARITIDES.

MONOCENTRUM. Chaudoir.

307 GRANDICEPS Chaud. Ann. Soc. Ent. Belg., 1869, p. 146.
North Australia.

308 LONGICEPS Chaud. Ann. Soc. Ent. Belg., 1866, p. 147.
North Australia.

309 MEGACEPHALUM Westw. Arcan. Ent., I., p. 86, t. 22, f. 3; Hope. Ann. Nat. Hist., 1842, IX., p. 426.
Port Essington ; N. Australia.

CONOPTERUM. Chaudoir.

310 AMABILE Casteln. Trans. Roy. Soc., Victoria, VIII., p. 135.
Lachlan River ; N. S. Wales.

311 INSIGNE Chaud. Ann, Soc. Ent. Belg., 1869, p. 148.
North Australia.

312 SUPERBUM Casteln. Trans. Roy. Soc., Victoria, VIII., p. 135.
Lachlan River ; N. S. Wales.

CARENIDIUM. Chaudoir.

313 DAMELII Macleay. Trans. Ent. Soc., N. S. Wales, 1869, II., p. 69.
Cape York ; North Australia.

314 GAGATINUM Macleay. Trans. Ent. Soc., N. S. Wales, 1863, I., p. 136.
South Australia.

315 KREUSLERÆ Macleay. Trans. Ent. Soc., N. S. Wales, 1869, II , p. 70.
South Australia.

316 LACUSTRE Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 326.
Lake Albert near Wagga Wagga ; N. S. Wales.

317 SAPPHIRINUM H. W. Bates. Ent. Month. Mag., 1874, XI., p. 99,
Australia.

318 SPALDINGI Macleay. Proc. Linn. Soc., N. S. Wales, 1878, II., p. 214.
Port Darwin ; N. Australia.

EUTOMA. Newman.

319 BIPUNCTATUM Macleay. Trans. Ent. Soc., N. S. Wales, 1863, I., p. 60.
Port Denison, Wide Bay, Gayndah, &c.; Queensland.

320 CAVIPENNE H. W. Bates. Ent. Month. Mag., 1874, XI., p. 99.

321 CUPRIPENNE Macleay. Trans. Ent. Soc., N. S. Wales, 1863, I., p. 61.
King George's Sound ; W. Australia.

322 DIGGLESII Macleay. Trans. Ent. Soc., N. S. Wales, 1869, II., p. 67.
Brisbane, Queensland.

323 EPISCOPALE Casteln. Trans. Roy. Soc., Victoria, VIII., p. 140.
Paroo River, Central Australia.

324 FILIFORME Casteln. Trans. Roy. Soc., Victoria, VIII., p. 141.
Darling River, N. S. Wales.

325 GLABERRIMUM Macleay. Trans. Ent. Soc., N. S. Wales, 1865, I., p. 180.
New South Wales.

326 LÆVE Casteln. Trans. Roy. Soc., Victoria, VIII., p. 142.
Rope's Creek, N. S. Wales.

327 LODDONENSE Casteln. Trans. Roy. Soc., Victoria, VIII., p. 142.
Loddon River, Victoria.

328 MASTERSI Macleay. Trans. Ent. Soc., N. S. Wales, 1869, II., p. 67.
Dabee, N. S. Wales.

329 NEWMANI Casteln. Trans. Roy. Soc., Victoria, VIII., p. 141.
Port Denison ; Queensland.

330 PUNCTIPENNE Macleay. Proc. Linn. Soc., N. S. Wales, 1883, VIII., p. 411.
Queensland.

331 PURPURATUM Casteln. Trans. Roy. Soc., Victoria, VIII., p. 141.
South Australia.

332 SPLENDIDUM Macleay. Trans. Ent. Soc., N. S. Wales, 1863, I., p. 60.
King George's Sound ; W. Australia.

333 SUBRUGOSULUM Macleay. Trans. Ent. Soc., N. S. Wales, 1865, p. 180.
Australia.

334 SUBSTRIATULUM Macleay. Trans. Ent. Soc., N. S. Wales, 1865, p. 179.
Richmond River, N. S. Wales.

335 TINCTILATUM Newm. The Ent. Mag., V., p. 171 ; Westw., Arcan. Ent., I., p. 86, t. 22, f. 2 ; Casteln., Proc. Roy. Soc., Victoria, 1857, p. 54.
Clarence River, N. S. Wales.

336 UNDULATUM Macleay. Trans. Ent. Soc., N. S. Wales, 1865, I., p. 180.
Wingelo ; N. S. Wales.

337 VIOLACEUM Macleay. Trans. Ent. Soc., N. S. Wales, 1863, I., p. 138.
South Australia.

NEOCARENUM. Castelnau.

338 CYLINDRIPENNE H. W. Bates. Ent. Month. Mag., 1874, XI., p. 98.
W. Australia.

339 ELONGATUM Macleay. Trans. Ent. Soc., N. S. Wales, 1863, I., p. 136.
Kreusleri Casteln. Trans. Roy. Soc., Victoria, VIII., p. 139.
South Australia.

340 MASTERSI Macleay. Trans. Ent. Soc., N. S. Wales, 1869, II., p. 68.
Mount Barker; W. Australia.

341 RETUSUM H. W. Bates. Ent. Month. Mag., 1874, XI., p. 98.
W. Australia.

342 RUGOSULUM Macleay. Trans. Ent. Soc., N. S. Wales, 1869, II., p. 98.
Salt Lake, Hummock Range; S. Australia.

343 SINGULARE Castln. Trans. Roy. Soc., Victoria, VIII., p. 139.
Swan River; W. Australia.

CARENUM. Bonelli.

344 AFFINE Macleay. Trans. Ent. Soc., N. S. Wales, 1863, I., p 142.

345 AMBIGUUM Macleay. Trans. Ent. Soc., N. S. Wales, 1865, I., p. 177.
King George's Sound; W. Australia.

346 ANGUSTIPENNE Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 98.
Gayndah; Queensland.

347 ANTHRACINUM Macleay. Trans. Ent. Soc., N. S. Wales, 1863, I., p. 135.
South Australia.

348 atronitens Macleay. Trans. Ent. Soc., N. S. Wales, 1863, I., p. 137.
Gawler; S. Australia.

349 1) Batesi Masters.
planipenne Bates. Ent. Month. Mag., 1874, XI., p. 97.
West Australia,

350 Bonellii Brulle. Hist. Nat., V., p. 63, t. 2, f. 6; Westw. Arcan. Ent., I., p. 83.
cyaneum Bonelli. Mem. Turin., 1813, p. 479.
N. S. Wales.

351 breviforme Bates. Ent. Month. Mag., 1874, XI., p. 96.
W. Australia.

352 Brisbanense Casteln. Trans. Roy. Soc., Victoria, VIII., p. 133.
Pine Mountain, Brisbane, Maryborough, &c., Queensland.

353 campestre Macleay. Trans. Ent. Soc., N. S. Wales, 1865, I., p. 186.
Lower Murrumbidgee, N. S. Wales.

354 carbonarium Casteln. Trans. Roy. Soc., Victoria, VIII., p. 135.
Esperanza Bay, W. Australia.

355 Chaudoiri Macleay. Trans. Ent. Soc., N. S. Wales, 1869, II., p. 63.
Australia.

356 coracinum Macleay. Trans. Ent. Soc., N. S. Wales, 1865, I., p. 178.
Ipswich, Queensland.

357 corruscum, Macleay. Trans. Ent. Soc.. N. S. Wales., 1863, I., p. 141.
North Coast of Australia.

358 cyaneum Fabr. Ent. Syst., I., p. 95; Lacord., Gen. Atl., t. 8, f. 1.
Fabricii Westw. Arcan. Ent., I., p. 85, t. 21, f. 5.
Endeavour River, Queensland.

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(1) A change is necessary, *planipenne* having been previously applied to a South Australian species by Mr. Macleay.

359 CYANIPENNE Macleay. Trans. Ent. Soc,, N. S. Wales, 1869, II., p. 62.
South Australia.

360 DEVASTATOR Casteln. Trans. Roy. Soc., Victoria, VIII., p. 137.
Swan River, Western Australia.

361 DE VISII Macleay. Proc. Linn. Soc., N. S. Wales, 1883, VIII., p. 412.
Queensland.

362 DIGGLESII Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 326.
Moreton Bay, Queensland.

363 DISTINCTUM Macleay. Trans. Ent. Soc., N. S. Wales, 1863, I., p. 145.
Australia.

364 DISPAR Macleay. Trans. Ent. Soc., N. S. Wales, 1869, II., p. 66.
South Australia.

365 EBENINUM Casteln. Trans. Roy. Soc., Victoria, VIII., p. 134.
South Australia.

366 ELEGANS Macleay. Trans. Ent. Soc., N. S. Wales, 1863, I., p. 144.
Victoria River.

367 FRONTALE Macleay. Trans. Ent. Soc., N. S. Wales, 1863, p. 185.
Wallaroo ; S. Australia.

368 IANTHINUM Macleay. Proc. Linn. Soc., N. S. Wales, 1883, VIII., p. 412.
Queensland. ?

369 INEDITUM Macleay. Trans. Ent. Soc., N. S. Wales, 1869, II., p. 65.

370 INTERMEDIUM Westw. Trans. Ent. Soc., 1849, p. 203.
Victoria.

371 INTERRUPTUM Macleay. Trans. Ent. Soc., N. S. Wales, 1865, I., p. 181.
Wingelo, Dabee, &c.; N. S. Wales.

372 KINGII Macleay. Trans. Ent. Soc., N. S. Wales, 1869, II., p. 64.
Liverpool Plains; N. S. Wales.

373 LÆVIGATUM Macleay. Trans. Ent. Soc., N. S. Wales, 1863, I., p. 134.
Schomburgki Casteln. Proc. Roy. Soc., Victoria, 1867, p. 137.
South Australia.

374 LÆVIPENNE Macleay. Trans. Ent. Soc., N. S. Wales, 1863, I., p. 59.
K. G. Sound; W. Australia.

375 LATERALE Macleay. Trans. Ent. Soc., N. S. Wales, 1865, I., p. 183.
Australia.

376 MARGINATUM Boisd. Voy. Astrol. Col., p. 23; Westw. Arcan. Ent., I., p. 84, t. 21, f. 1.
New South Wales.

377 MUCRONATUM Macleay. Trans. Ent. Soc., N. S. Wales, 1866, I., p. 55.
Gawler; S. Australia.

378 MULTIIMPRESSUM Casteln. Trans. Roy. Soc., Victoria, VIII., p. 136.
Swan River; W. Australia.

379 MURRUMBIDGENSE Macleay. Trans. Ent. Soc., N. S. Wales, 1865, I., p. 183.
Murrumbidgee; N. S. Wales.

380 NICKERLI Ancey. Le Nat., 1880, II., p. 221.
Australia.

381 NIGERRIMUM Macleay. Trans. Ent. Soc., N. S. Wales, 1865, I., p. 176.
South Australia.

382 NITESCENS Macleay. Trans. Ent. Soc., N. S. Wales, 1869, II., p. 64.
Salt Lake; Hummock Range; S. Australia.

383 OBLONGUM Macleay. Trans. Ent. Soc., N. S. Wales, 1863, I., p. 138.
Adelaide ; South Australia.

384 OBSCURUM Macleay. Trans. Ent. Soc., N. S. Wales, 1865, I., p. 182.
New South Wales.

385 OCCULTUM Macleay. Trans. Ent. Soc., N. S. Wales 1871, II., p. 97.
Gayndah ; Queensland.

386 ODEWAHNII Casteln. Trans. Roy. Soc., Victoria, VIII., p. 137, South Australia.

387 OPACUM Macleay. Trans. Ent. Soc., N. S. Wales, 1869, II., p. 63.
Clarence River ; N. S. Wales.

388 ORDINATUM Macleay. Trans. Ent. Soc., N. S. Wales, 1869, II., p. 66.
South Australia.

389 OVIPENNE Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 98.
Gayndah ; Queensland.

390 PARVULUM Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 325.
Murrurundi ; N. S. Wales.

391 PERPLEXUM White. Grey's Trav., II., p. 456 ; Westw. Arc. Ent., I., p. 84, t. 21, f. 2.
King George's Sound ; W. Australia.

392 PLANIPENNE Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 326.
Port Wakefield ; S. Australia.

393 POLITULUM Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 98.
Gayndah ; Queensland.

394 POLITUM Westw. Arcan. Ent., I., p. 84, t. 21, f. 3.
Tasmania ; Victoria.

395 porphyreum H. W. Bates. Ent. Month. May., 1874, XI., p. 95.
W. Australia.

396 propinquum Macleay. Trans. Ent. Soc., N. S. Wales, 1869, II., p. 64.
Liverpool Plains; N. S. Wales.

397 puncticolle Macleay. Trans. Ent. Soc., N. S. Wales, 1863, I., p. 135.
South Australia.

398 punctulatum Macleay. Trans. Ent. Soc., N. S. Wales, 1863, I., p. 143.
Byalla, N. S. Wales.

399 pusillum Macleay. Proc. Linn. Soc., N. S. Wales, 1883, VIII., p. 412.
Queensland.

400 quadripunctatum Macleay. Trans. Ent. Soc., N. S. Wales, 1863, I., p. 59.
Port Denison, &c., Queensland.

401 rectangulare Macleay. Trans. Ent. Soc., N. S. Wales, 1863, I., p. 139.
South Australia.

402 Riverinæ Macleay. Trans. Ent. Soc., N. S. Wales, 1865, I., p. 181.
Lower Murrumbidgee, N. S. Wales.

403 rufipes Macleay. Trans. Ent. Soc., N. S. Wales, 1869, II., p. 65.
Stirling Range, W. Australia.

404 scaritioides Westw. Arcan. Ent., I., p. 92.
New South Wales.

405 scitulum Macleay. Trans. Ent. Soc., N. S. Wales, 1863, I., p. 144.
Moreton Bay, Queensland.

406 sexpunctatum Macleay. Trans. Ent. Soc., N. S. Wales, II., p. 62.
Lower Murrumbidgee, N. S. Wales.

407 SIMILE Macleay. Trans. Ent. Soc., N. S. Wales, 1865, I., p. 182.
Moreton Bay, Queensland.

408 SMARAGDULUM Westw. Arcan. Ent., I., p. 84, t. 21, f. 4.
Swan River, W. Australia.

409 STRIATO-PUNCTATUM Macleay. Trans. Ent. Soc., N. S. Wales, 1865, I., p. 184.
Daly Waters, N. Australia.

410 STRIATO-PUNCTULATUM Macleay. Trans. Ent. Soc., N. S. Wales, 1865, I., p. 178.
Murrumbidgee, N. S. Wales.

411 SUBCOSTATUM Macleay. Trans. Ent. Soc., N. S. Wales, 1865, I., p. 186.
Clarence River, N. S. Wales.

412 SUBCYANEUM Macleay. Trans. Ent. Soc., N. S. Wales, 1869, II., p. 66.
South Australia.

413 SUBMETALLICUM Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 98.
Gayndah; Queensland.

414 SUBPLANATUM H. W. Bates. Ent. Month. Mag., 1874, XI., p. 96.
W. Australia.

415 SUBPORCATULUM Macleay. Trans. Ent. Soc., N. S. Wales, 1865, I., p. 184.
Wide Bay; Queensland.

416 SUBQUADRATUM Macleay. Trans. Ent. Soc., N. S. Wales, 1865, I., p. 177.
South Australia.

417 SUBRUGOSULUM Macleay. Trans. Ent. Soc., N. S. Wales, 1865, I., p. 180.
Australia.

418 SUBSTRIATULUM Macleay. Trans. Ent. Soc., N. S. Wales, 1865, I., p. 179.
Richmond River; N. S. Wales.

419 SUMPTUOSUM Westw. Arcan. Ent., I., p. 86, t. 22, f. 1.
Port Essington; North Australia.

420 SUPERBUM Casteln. Trans. Roy. Soc., Victoria, VIII., p. 135.
Lachlan River; N. S. Wales.

421 TERRÆ-REGINÆ Macleay. Proc. Linn. Soc., N. S. Wales, 1883, VIII., p. 411.
Albania Downs; Queensland.

422 TRISTE Macleay. Trans. Ent. Soc., N. S. Wales, 1869, II. p. 63.
Maryborough, Gayndah; Queensland.

423 UNDULATUM Macleay. Trans. Ent. Soc., N. S. Wales, 1865, I., p. 189.
Wingelo, &c.; N. S. Wales.

424 VIRIDI-MARGINATUM Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 97.
Gayndah; Queensland.

425 VIRIDIPENNE Westw. Trans. Ent. Soc., 1849, V., p. 202.
New England; N. S. Wales.

426 WESTWOODII Casteln. Trans. Roy. Soc., Victoria, VIII, p. 136,
Mount Kosciusko, Bombala, &c.; N. S. Wales.

LACCOPTERUM. Macleay.

427 DARWINIENSE Macleay. Proc. Linn. Soc., N. S. Wales, 1878, II., p. 214.
Carenum Darwiniense Macleay.
Port Darwin; N. Australia.

428 DEAURATUM Macleay. Trans. Ent. Soc., N. S. Wales, 1863, I., p. 140.
Carenum deauratum Macleay.
Port Curtis, Gayndah, Wide Bay, &c.; Queensland.

429 FOVEIPENNE Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 325.
Carenum foveipenne Macleay.
South Australia.

430 FOVEOLATUM Macleay. Trans. Ent. Soc., N. S. Wales, 1863, I., p. 141.
Carenum foveolatum Macleay.
N. E. Coast of Australia.

431 GEMMATUM Westw. Arcan. Ent., I., p. 85, t. 21, f. 7.
Carenum gemmatum Westw.
Port Essington ; N. Australia.

432 SALEBROSUM Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 97.
Carenum salebrosum Macleay.
Gayndah ; Queensland.

433 SPENCEI West. Ann. Nat. Hist., 1841, p. 123 ; Arcan. Ent., I., p. 85, t. 21, f. 6.
Carenum Spencei Westw.
N. S. Wales.

434 VARIOLOSUM Macleay. Trans. Ent. Soc., N. S. Wales, 1863, I., p. 143.
Carenum variolosum Macleay.
Murrumbidgee ; N. S. Wales.

TERATIDIUM. H. W. Bates.

435 MACROS H. W. Bates. Ent. Month. Mag., 1874, XI., p. 100.
W. Australia.

PHILOSCAPHUS. Macleay.

436 CARINATUS Macleay. Trans. Ent. Soc., N. S. Wales, 1863, I., p. 142.
Carenum carinatum Macleay.
Wingelo, Bungendore, &c. ; N. S. Wales.

437 COSTALIS Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 324.
Nickol Bay ; W. Australia.

438 LATERALIS Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 324.
South Australia.

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Gayndah ; Queensland.

440 tuberculatus Macleay. Trans. Ent. Soc., N. S. Wales, 1863, I., p. 63.
Carenum tuberculatum Macleay.

EURYSCAPHUS. Macleay.

441 affinis Casteln. Trans. Roy. Soc., Victoria, VIII., p. 130.
Cooper's Creek ; Queensland.

442 angulatus Macleay. Trans. Ent. Soc., N. S. Wales, 1865, I., p. 188.
Victoria River ; Queensland.

443 bipunctatus Macleay. Trans. Ent. Soc., N. S. Wales, 1865, I., p. 189.
South Australia.

444 carbonarius Casteln. Trans. Roy. Soc., Victoria, VIII., p. 131.
Cooper's Creek ; Queensland.

445 dilatatus Macleay. Trans. Ent. Soc., N. S. Wales, 1865, I., p. 188.
Australia.

446 Hopei Casteln. Trans. Roy. Soc., Victoria, VIII., p, 131.
Central Australia.

447 Howittii Casteln. Trans. Roy. Soc. Victoria, VIII., p. 130.
Port Augusta ; S. Australia.

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Victoria River. (Mitchell's Expedition).

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450 Waterhousei Macleay. Trans. Ent. Soc., N. S. Wales, 1864, p. 146

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Champion Bay, W. Australia.

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Victoria ; Tasmania.

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GEOSCAPTUS. Chaudoir.

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Victoria River, (Mitchell's Expedition.)

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Scarites ruficornis Casteln. Trans. Roy. Soc., Victoria, VIII., p. 144.
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Australia (widely distributed.)

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Australia (widely distributed.)

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Victoria River (Mitchell's Expedition.)

471 PLICATUS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 144.
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Escape Cliff; North Australia.

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North Australia (Hely's Expedition.)

GNATHOXYS. Westwood.

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Swan River ; W. Australia.

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DYSCHIRIUS. Bonelli.

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King George's Sound ; W. Australia.

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Sutton Forest, N. S. Wales.

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Port Denison ; Queensland.

SCOLYPTUS. Putzeys.

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Swan River, W. Australia.

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Melbourne, Victoria.

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Australia.

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Australia.

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King George's Sound; W. Australia.

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Swan River; W. Australia.

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Melbourne; Victoria.

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Victoria.

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Melbourne; Victoria.

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Melbourne; Victoria.

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Rockhampton ; Queensland.

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Australia.

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Melbourne ; Victoria.

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Melbourne, Victoria.

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Queensland.

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South Australia.

Sub-Family. PANAGEIDES.

EPICOSMUS. Chaud.

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Rockhampton, Gayndah, &c. ; Queensland.

532 AUSTRALASIÆ Chaud. Bull. Mosc., 1850, II., p. 419.
Eudema Australasiæ Chaud.
N. S. Wales, Victoria, S. Australia.

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Eudema elongatum Casteln. Trans. Roy. Soc., Victoria, VIII., p. 147.
N. S. Wales.

534 COMPTUS Laf. (Isotarsus.) Ann. Soc., Ent. France, 1851, p. 20.
Eudema Australe. Casteln (not Dejean.) Trans. Roy. Soc., Victoria, VIII., p. 147.
N. S. Wales ; Queensland.

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Rockhampton ; Queensland.

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Port Denison, Cleveland Bay, Cape York, &c. ; Queensland.

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Eudema Rockhamptonense Casteln.
Rockhampton ; Queensland.

TINOGNATHUS. Chaudoir.

538 PARVICEPS Chaud. Ann. Soc., Ent. Belg.. 1878, p. 138.
Moreton Bay ; Queensland.

TRICHISA. Motschulsky.

539 AZUREA Chaud. (Epicosmus.) Bull. Mosc., II., p. 348.
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N. S. Wales ; Queensland.

PLATYLYTRON. Macleay.

540 AMPLIPENNE Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 328.
King George's Sound ; W. Australia.

Sub-Family. CHLÆNIDES.

CHLÆNIUS. Bonelli.

541 AUSTRALIS Dej. Spec. V., p. 650.
Australia. (Widely distributed).

542 BIMACULATUS Macleay. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 115.
Port Denison ; Queensland.

543 DARLINGENSIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 148.
Darling River ; N. S. Wales.

544 GREYANUS White. Voy. Grey. Austr., 1841, II., p. 458 ;
Chaud. Bull. Mosc., 1856, III., p. 290.
King George's Sound ; W. Australia.

545 MACULIFER Casteln. Trans. Roy. Soc., Victoria, VIII., p. 148.
New South Wales. Queensland.

546 MACULIGER Casteln. Trans. Roy. Soc., Victoria, VIII., p. 148.
Rockhampton ; Queensland.

547 MARGINATUS Dej. Spec., II., p. 305.
Australia. (Widely distributed).

548 OPHONOIDES Fairm. Ann. Fr., 1843, p. 11, t. 1, f. 1 ; Chaud. Bull. Mosc., 1856, III., p. 197.
Australia.

549 PEREGRINUS Laferte. Ann. Fr., 1851, p. 247 ; Chaud. Bull. Mosc., 1856, III., p. 264.
New South Wales. Queensland.

550 PUNCTICEPS Gem. and Harold. Cat., p. 224.
punctatus Chaud. Bull. Mosc., 1856, III., p. 200.
Moreton Bay ; Queensland.

551 SUBCOSTATUS Macleay. Trans. Ent. Soc., N. S. Wales, 186
I., p. 114.
Port Denison ; Queensland.

HOLOLEIUS. Laferté.

552 NITIDULUS Dej. Spec., II., p. 341.
Northern parts of N. S. Wales, and Southern parts
Queensland.

ANATRICHIS. Leconte.

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COPTOCARPUS. Chaudoir.

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Champion Bay, W. Australia.
556 CHAUDOIRI Macleay. Trans. Ent. Soc., N. S. Wales, 18
II., p. 329.
Clarence River, N. S. Wales.
557 CONVEXUS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 1
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558 GIBBUS Chaud. Ann. Soc. Ent. Fr., 1882 (6), II., p. 511.
Australia.
559 NITIDUS Macleay. Trans. Ent. Soc., N. S. Wales, 1873,
p. 330.
Cape York ; North Australia.
560 OVIFORMIS Chaud. Ann. Soc. Ent. Fr., 1882 (6), II., p. 5
Cape York ; North Australia.
561 PLANIPENNIS Macleay. Proc. Linn. Soc., N. S. Wales, 18
II., p. 216.
Port Darwin, North Australia.
562 RIVERINÆ Macleay. Trans. Ent. Soc., N. S. Wales, 187
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Murrumbidgee ; N. S. Wales.

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Swan River; W. Australia.

OODES. Bonelli.

564 BOSTOCKI Casteln. Trans. Roy. Soc., Victoria, VIII., p. 151.
Nickol Bay; W. Australia.

565 DENISONENSIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 150.
Port Denison; Queensland.

566 FUSCITARSIS Blanch. Voy. Pole. Sud., p. 39, t. 1, f. 14.
North Australia.

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Swan River; W. Australia.

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Swan River; W. Australia.

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Cooper's Creek; Central Australia.

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Swan River; W. Australia.

571 MODESTUS Casteln. Trans. Roy. Soc., Victoria, VIII, p. 150.
Melbourne; Victoria.

572 OBLONGUS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 149.
Rope's Creek; N. S. Wales.

573 PARROENSIS Casteln. Trans. Roy. Soc., Victoria. VIII., p. 150.
Paroo River; Central Australia.

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Paroo River; Central Australia.

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Swan River; W. Australia.

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Port Denison; Queensland.

577 WATERHOUSEI Casteln. Trans. Roy. Soc., Victoria, VIII., p. 149.
Arnheim's Land; N. Australia.

Sub-Family. LICINIDES.

BADISTER. Clairville.

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Gayndah ; Queensland.

PHYSOLESTHUS. Chaudoir,

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Australia.

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Gayndah ; Queensland.

581 SUTURALIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 152.
Paroo River ; Central Australia.

Sub-Family. CNEMACANTHIDES.

PROMECODERUS. Dejean.

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King George's Sound ; W. Australia.

583 ANTHRACINUS Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 334.
Lower Murrumbidgee ; N. S. Wales.

584 BASSII Casteln. Trans. Roy. Soc., Victoria, VIII., p. 166.
King's Island ; Bass's Straits.

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Australia.

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Australia.

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South Australia.

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Australia.

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Murrumbidgee; N. S. Wales.

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Australia.

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Melbourne; Victoria.

592 GIBBOSUS Gray. Anim. Kingd., II., p. 276, t. 15, f. 1; t. 34, f. 5; Guér. Rev. Zool., 1841, p. 189; Blanch. Voy. Pole. Sud., p. 18, t. 3, f. 5.
Tasmania.

593 GRACILIS Germ. Linn. Ent., III., 1848, p. 169.
South Australia.

594 HOWITTII Casteln. Trans. Roy. Soc., Victoria, VIII., p. 171.
Melbourne; Victoria.

595 HUNTERIENSIS Macleay. Trans Ent. Soc., N. S. Wales, 1873, II., p. 332.
Hunter River; N. S. Wales.

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Monaro; N. S. Wales.

597 INTERRUPTUS Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 331.
Clarence River; N. S. Wales.

598 LUCIDICOLLIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 171.
Melbourne; Victoria.

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Australia.

600 MAJUSCULUS Putz. Stett. Ent. Zeit., 1868, p. 333.
North Australia.

601 MARITIMUS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 168.
Cape Schanck; Victoria.

602 MASTERSI Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 332.
Monaro; N. S. Wales.

603 MINUTUS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 168.
Swan River ; W. Australia.

604 MODESTUS Casteln, Trans. Roy. Soc., Victoria, VIII., p. 170.
Tasmania.

605 MOROSUS Putz. Stett. Ent. Zeit., 1868, p. 333.
Australia.

606 NEGLECTUS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 171.
Mountains of Victoria.

607 NIGRICORNIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 167.
Mountains of Victoria.

608 OBLONGUS Casteln. Trans. Roy, Soc., Victoria, VIII., p. 170.
Melbourne ; Victoria.

609 OLIVACEUS Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 334.
Piper's Flats; N. S. Wales.

610 PARVULUS Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 331.
Upper Murrumbidgee ; N. S. Wales.

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N. S. Wales.

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Monaro ; N. S. Wales.

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Mountains of Victoria.

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Lower Murrumbidgee ; N. S. Wales.

615 SCAUROIDES Casteln. Trans. Roy. Soc., Victoria, VIII., p. 169.
Swan River ; W. Australia.

616 SEMISTRIATUS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 168.
Rope's Creek, Clarence River, &c. ; N. S. Wales.

617 STRIATOPUNCTATUS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 168.
Victoria. Darling River ; N. S. Wales.

618 SUBDEPRESSES Guér. Rev. Zool., 1841, p. 190.
Tasmania.

619 SUTURALIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 171.
Adelaide; S. Australia.

620 TASMANICUS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 166.
Tasmania.

621 WILCOXI Casteln. Trans. Roy. Soc., Victoria, VIII., p. 170.
Clarence River; N. S. Wales.

PARROA. Castelnau.

622 BICOLOR Casteln. Trans. Roy. Soc., Victoria, VIII., p. 174.
Paroo River; Central Australia.

623 CARBONARIA Casteln. Trans. Roy. Soc., Victoria, VIII., p. 174.
Swan River; W. Australia.

624 GRANDIS Casteln. Trans, Roy. Soc., Victoria, VIII., p. 174.
Swan River; W. Australia.

625 HOWITTII Casteln. Trans. Roy. Soc., Victoria, VIII., p. 173.
Paroo River; Central Australia.

626 VIOLACEA Casteln. Trans. Roy. Soc., Victoria, VIII., p. 174.
Swan River; W. Australia.

ADOTELA. Castelnau.

627 CARENOIDES Putz. Ann. Mus. Genov., 1873, IV., p. 341.
Port Denison; Queensland.

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Swan River; W. Australia.

629 ESMERALDA Casteln. Trans. Roy. Soc., Victoria, VIII., p. 175.
Swan River; W. Australia.

630 NIGERRIMA Macleay Trans. Ent. Soc., N. S. Wales, 1873, II., p. 335.
Percy Islands; North-east Coast.

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Roebuck Bay; W. Australia.

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Promecoderus viridis Macleay.
Gayndah ; Queensland.

CEROTALIS. Castelnau.

633 SEMIVIOLACEA Casteln. Trans. Roy. Soc., Victoria, VIII., p. 175.
Port Lincoln ; S. Australia.

634 SUBSTRIATA Casteln. Trans. Roy. Soc., Victoria, VIII., p. 175.
King George's Sound ; W. Australia.

635 VERSICOLOR Casteln. Trans. Roy. Soc., Victoria, VIII., p. 175.
Victoria.

BRITHYSTERNUM. Macleay.

636 CALCARATUM Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 367.
Peak Downs ; Queensland.

PERCOSOMA. Schaum.

637 SULCIPENNE H. W. Bates. Cist. Ent., 1878, II., p. 317.
Northern Tasmania.

MAORIA. Castelnau,

638 DYSCHIRIOIDES Casteln. Roy. Soc., Victoria, VIII., p. 165.
Crooked River, Gipp's Land ; Victoria.

MECODEMA. Blanchard.

639 BLAGRAVEI Casteln. Trans. Roy. Soc., Victoria, VIII., p. 161.
Mountains of Victoria.

640 MONTANUM Casteln. Trans. Roy. Soc., Victoria, VIII., p. 163.
Mountains of Victoria.

641 PERCOIDES Casteln. Trans. Roy. Soc., Victoria, VIII., p. 163.
Mount Wellington ; Tasmania.

Sub-Family. STOMIDES.

MEONIS. Castelnau.

642 ATER Casteln. Trans. Roy. Soc., Victoria, VIII., p. 156.
Clarence River ; N. S. Wales. Brisbane, Gayndah ; Queensland.

643 NIGER Casteln. Trans. Roy. Soc., Victoria, VIII., p. 156.
Clarence River ; N. S. Wales.

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Gayndah ; Queensland.

DARODILIA. Casteln.

645 MANDIBULARIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 151.
Lachlan River ; N. S. Wales.

Sub-Family. CRATOCERIDES.

AMBLYGNATHUS. Dejean.

646 MINUTUS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 179.
King George's Sound ; W. Australia.

Sub-Family. HARPALIDES.

PHORTICOSOMUS. Schaum.

647 EDELI Casteln. Trans. Roy. Soc., Victoria, VIII., p 178.
Swan River ; W. Australia.

648 FELIX Schaum. Journ of Ent., II., p. 78, t. 4, f. 5.
Victoria, N. S. Wales.

649 GRANDIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 177.
Cooper's Creek ; Central Australia.

650 LATERALIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 177.
Paroo River ; Central Australia.

651 MINUTUS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 177.
Paroo River ; Central Australia.

652 NUYTSI Casteln. Trans. Roy. Soc., Victoria, VIII., p. 178.
Nickol Bay; W. Australia.

653 ROTUNDIPENNIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 177.
Paroo River; Central Australia.

654 RUGICEPS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 100.
Gayndah; Queensland.

GEOBAENUS. Dejean.

655 AUSTRALASIÆ Guér. Voy. Coquille, 1830, II., p. 59.
Australia.

GNATHAPHANUS. W. S. Macleay.

656 ADELAIDÆ Casteln. Trans. Roy. Soc., Victoria, VIII., p. 194.
Harpalus Adelaidæ Casteln.
Harpalus marginicollis Casteln. Trans. Roy. Soc., Victoria, VIII., p. 189.
Harpalus Parroensis Casteln. Trans. Roy. Soc., Victoria, VIII., p. 184.
Harpalus Melbournensis Casteln. Trans. Roy. Soc., Victoria, VIII., p. 183.
King George's Sound; W. Australia; South Australia; Victoria; N. S. Wales.

657 ALTERNANS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 185.
Harpalus alternans Casteln.
Moreton Bay; Queensland.

658 IMPRESSIPENNIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 186.
Harpalus impressipennis Casteln.
Rockhampton; Queensland.

659 LÆVICEPS Macleay. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 116.
Pachauchenius læviceps Macleay.
Port Denison; Cleveland Bay, &c.; Queensland.

660 LICINOIDES Hope. Ann. Nat. Hist., 1842, IX., p. 427.
Australia.

661 MELANARIUS Dej. Spec., IV., p. 311.
Diaphoromerus melanarius Dej.
Harpalus Thouzeti Casteln. Trans. Roy. Soc., Victoria, VIII., p. 182.
Harpalus Wilcoxi Casteln. Trans. Roy. Soc., Victoria, VIII., p. 187.
Clarence River; Sydney, &c., N. S. Wales; Rockhampton, &c.; Queensland.

662 MONTANUS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 186.
Harpalus punctifer Casteln. Trans. Roy. Soc., Victoria, VIII., p. 184.
Harpalus planipennis Macleay. Trans. Ent. Soc., N. S. Wales. 1871, II., p. 101.
Brisbane, Pine Mountain, Gayndah, &c.; Queensland.

663 PICIPES Macleay. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 117.
Harpalus picipes Macleay.
Port Denison; Queensland.

664 PULCHER Dej. Spec. IV., p. 282; W. S. Macleay Dej. Cat., 3 ed., p. 51.
Harpalus interstitiales Macleay. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 117.
New South Wales; Queensland.

665 RECTANGULUS Chaud. Ann. Mus. Genov., 1878, XII., p. 507,
Rockhampton; Queensland.

666 DENISONENSIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 183.
Harpalus Denisonensis Casteln.
Port Denison; Queensland.

ANISODACTYLUS. Dejean.

667 OPACIPENNIS Chaud. Ann. Mus. Genov., 1878, XII., p. 513.
S. W. Australia.

668 ROTUNDICOLLIS Casteln. Trans. Roy. Soc., Victoria, VIII.,
p. 182.
Harpalus rotundicollis Casteln.
Australia. (Widely distributed).

669 WATERHOUSEI Casteln. Trans. Roy. Soc., Victoria, VII
p. 182.
Harpalus Waterhousei Casteln.
Adelaide ; S. Australia.

HAPLANER. Chaud.

670 VELOX Casteln. Trans. Roy. Soc., Victoria, VIII., p. 18
Chaud. Ann. Mus. Genov., 1878, XII., p. 514.
Harpalus velox Casteln.
Melbourne ; Victoria.

DIAPHOROMERUS. Chaudoir.

671 ÆREUS Dej. Spec., IV., p. 384.
Harpalus Boisduvallii Casteln. Trans. Roy. Soc., Victo
VIII., p. 196.
Swan River ; W. Australia.

672 AMAROIDES Casteln. Trans. Roy. Soc., Victoria, VIII., p. 1
Harpalus amaroides Casteln.
Harpalus patrueloides Casteln. Trans. Roy. Soc., Victo
VIII., p. 183.
Harpalus Vandiemensis Casteln. Trans. Roy. Soc., Victo
VIII., p. 187.
Harpalus Illawarensis Casteln. Trans. Roy. Soc., Victo
VIII., p. 194.
Australia (widely distributed.)

673 ANGUSTULUS Chaud. Ann. Mus. Genov., 1878, p. 479.
Rockampton ; Queensland.

674 AUSTRALASIÆ Dej. Spec., IV., p. 295.
Australia.

675 **Australis** Dej. Spec., IV., p. 385.
Harpalus inornatus Germ. Linn. Ent., 1848, III., p. 169.
Harpalus Coxii Casteln. Trans. Roy, Soc., Victoria, VIII., p. 193.
Clarence River; N. S. Wales. S. Australia.

676 **Bostocki** Casteln. Trans. Roy. Soc., Victoria, VIII., p. 196.
Harpalus Bostocki Casteln.
Swan River; W. Australia.

677 **Dampieri** Casteln. Trans. Roy. Soc., Victoria, VIII., p. 195.
Harpalus versicolor Casteln. Trans. Roy. Soc., Victoria, VIII., p. 196.
Port Lincoln; S. Australia. Swan River, K. G. Sound; W. Australia.

678 **Deyrollei** Casteln. Trans. Roy. Soc., Victoria, VIII., p. 196.
Harpalus Deyrollei Casteln.
Port Lincoln; S. Australia.

679 **Edwardsii** Casteln. Trans. Roy. Soc., Victoria, VIII., p. 187.
Harpalus Edwardsii Casteln.
Victoria.

680 **femoralis** Casteln. Trans. Roy. Soc. Victoria, VIII., p. 196.
Harpalus femoralis Casteln.
Harpalus planoimpressus Casteln. Trans. Roy. Soc., Victoria, VIII., p. 187.
Brisbane, Rockampton, &c.; Queensland.

681 **flavipalpis** Macleay. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 118.
Harpalus flavipalpis Macleay.
Port Denison; Queensland.

682 **Flindersii** Casteln. Trans. Roy. Soc., Victoria, VIII., p. 188.
Harpalus Flindersii Casteln.
Rockhampton; Queensland.

683 **Germari** Casteln. Trans. Roy. Soc., Victoria, VIII., p. 190.
Harpalus Germari Casteln.
Harpalus Erichsoni Casteln. Trans. Roy. Soc., Victoria, VIII., p. 191.
Melbourne; Victoria.

684 INÆQUALIPENNIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 185.
Harpalus inæqualipennis Casteln.
King George's Sound, Swan River; W. Australia.

685 IRIDIPENNIS Chaud. Bull. Mosc., 1843, p. 105.
Harpalus infelix Casteln. Trans. Roy. Soc., Victoria, VIII., p. 192.
Rockhampton, Gayndah, &c.; Queensland.

686 LAPEYROUSEI Casteln. Trans. Roy. Soc., Victoria, VIII., p. 192.
Harpalus Lapeyrousei Casteln.
Sydney; N. S. Wales.

687 LUCIDICOLLIS Dej., Spec., IV., p. 312.
Australia.

688 MANDIBULARIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 197.
Harpalus mandibularis Casteln.
Port Denison; Queensland.

689 MŒSTUS Dej. Spec., IV., p. 382.
Harpalus rana Casteln. Trans. Roy. Soc., Victoria, VIII., p. 186.
Harpalus Yarræ Casteln. Trans. Roy. Soc., Victoria, VIII., p. 189.
Harpalus Tasmanicus Casteln. Trans. Roy. Soc., Victoria VIII., p. 191.
Victoria; Tasmania.

690 OVATUS Chaud. Ann. Mus. Genov., 1878, p. 479.
Cape York; N. Australia.

691 OBLONGIUSCULUS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 183.
Harpalus oblongiusculus Casteln.
Brisbane; Queensland.

692 PLANIUSCULUS Chaud. Ann. Mus. Genov., 1878, p. 483.
Australia.

693 QUADRICOLLIS Chaud. Ann. Mus. Genov., 1878, p. 486.
North Australia.

694 RANULA Casteln. Trans. Roy. Soc., Victoria, VIII., p. 191.
Harpalus ranula Casteln.
Melbourne ; Victoria.

695 RECTANGULUS Chaud. Ann. Mus. Genov., 1878, p. 479.
South Australia. Tasmania.

696 RUGOSIPENNIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 184.
Harpalus rugosipennis Casteln.
Melbourne ; Victoria.

697 SCULPTURALIS Casteln. Trans. Roy. Soc., Victoria, VIII, p. 185.
Harpalus sculpturalis Casteln.
King Georges Sound, Swan River ; W. Australia.

698 SCULPTIPENNIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 185.
Harpalus sculptipennis Casteln.
King George's Sound ; W. Australia.

HYPHARPAX. W. S. Macleay.

699 FLAVITARSIS Chaud. Ann. Mus. Genov., 1878, XII., p. 498.
Gulf of Carpentaria ; N. Australia.

700 KINGII Casteln. Trans. Roy. Soc., Victoria, VIII., p. 193.
Harpalus Kingii Casteln.
King George's Sound ; W. Australia.

701 KREFFTII Casteln. Trans. Roy. Soc., Victoria, VIII., p. 190.
Harpalus Krefftii Casteln.
Port Denison ; Queensland.

702 LATIUSCULUS Chaud. Ann. Mus. Genov., 1878, XII., p. 499.
Tasmania.

703 PARVUS Chaud Ann. Mus. Genov., 1878, XII., p. 500.
South Australia.

704 PERONII Casteln. Trans. Roy. Soc., Victoria, VIII., p. 188.
Harpalus Peronii Casteln.
Harpalus Novæ-Hollandiæ Casteln. Trans. Roy. Soc., Victoria, VIII., p. 197.
Victoria. K. G. Sound ; W. Australia.

705 ROTUNDIPENNIS Chaud. Ann. Mus. Genov., 1878, XII., p. 500.
Australia.

MICROSAURUS. H. W. Bates.

706 INSULARIS Bates. Cist. Ent., 1878, II., p. 319.
Tasmania.

THENAROTES. H. W. Bates.

707 TASMANICUS Bates. Cist. Ent., 1878, II., p. 321.
Tasmania.

NEBRIOSOMA, Castelnau.

708 FALLAX Casteln. Trans. Roy. Soc., Victoria, VIII., p. 179.
Kiama ; N. S. Wales.

LECANOMERUS. Chaudoir.

709 ABERRANS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 101.
Gayndah ; Queensland.

710 INSIDIOSUS Chaud. Bull. Mosc., 1850, II., p. 447.
Australia.

711 RUFICEPS Macleay. Trans. Ent. Soc., N. S. Wales, 1871 II., p. 100.
Gayndah ; Queensland.

HARPALUS. Latreille.

712 ÆNEO-NITENS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 102.
Gayndah ; Queensland.

713 ANGUSTATUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 102.
Gayndah ; Queensland.

714 ATRO-VIRIDIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 103.
Gayndah ; Queensland.

715 BRUNNEUS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 194.
Adelaide ; S. Australia. Swan River ; W. Australia.

716 CONVEXIUSCULUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 102.
Gayndah; Queensland.

717 FORTNUMI Casteln. Trans. Roy. Soc., Victoria, VIII., p. 195,
Adelaide; S. Australia.

718 GAYNDAHENSIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 102.
Gayndah; Queensland.

719 GORYI Gory. Ann. Fr., 1833, p. 241; Boisd. Voy. Astrol., 1835, p. 46.
Australia.

720 IGNOBILIS Bohem. Res. Eugen., 1858, p. 10.
Sydney; N. S. Wales.

721 INTERIORIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 181.
Paroo River; Central Australia.

722 MARGINEPUNCTATUS Dej. Spec., IV., p. 396; Boisd. Voy. Astrol., p. 45.
Australia.

723 PROMPTUS Erich. Weigm. Arch., 1842, I., p. 126.
Tasmania.

724 QUADRATICOLLIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 188.
Sydney; N. S. Wales. Brisbane; Queensland.

725 VERTICALIS Erichs. Weigm. Arch., 1842, I., p. 126.
Tasmania.

726 VESTIGIALIS Erichs. Weigm. Arch., 1842, I., p. 127.
Tasmania.

ACUPALPUS. Latreille.

727 ANGULATUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 104.
Gayndah; Queensland.

728 MASTERSI Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 104.
Gayndah; Queensland.

729 PICEUS Guér. Voy. Coquille, 1830, II., p. 60.
Sydney; N. S. Wales.

CYCLOTHORAX. **Macleay.**

730 PUNCTIPENNIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 105.
Gayndah; Queensland.

STENOLOPHUS. **Dejean.**

731 DINGO Casteln. Trans. Roy. Soc., Victoria, VIII., p. 197.
Harpalus dingo Casteln.
Rockhampton; Queensland.

732 POLITUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 103.
Gayndah; Queensland.

Sub-Family. TRIGONOTOMIDES.

LEIRODIRA. **Castelnau.**

733 AURICOLLIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 159.
Northern parts of N. S. Wales; Southern parts of Queensland.

734 LATREILLEI Casteln. Trans. Roy. Soc., Victoria, VIII., p. 158.
Brisbane, Maryborough, Gayndah, &c.; Queensland.

735 LIOPLEURA Chaud. Ann. Soc., Ent. Belg., XI., p. 163.
Moreton Bay; Queensland.

LESTICUS. **Dejean.**

736 CHLORONOTUS Chaud. Ann. Soc., Ent. Belg., XI., p. 156.
Northern parts of N. S. Wales. Queensland.

ABACETUS. **Dejean.**

737 ANGUSTIOR Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 105.
Gayndah; Queensland.

738 ATER Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 105.
Gayndah; Queensland.

739 AUSTRALASIÆ Chaud. Bull. Mosc., 1878, LIII., p. 26.
Cape York ; N. Australia.

740 AUSTRALIS Chaud. Bull. Mosc., 1870, XLII., p. 375.
Moreton Bay ; Queensland.

741 HÆMORRHOUS Chaud. Bull. Mosc., 1878, LIII., p. 27.
Australia.

DRIMOSTOMA. Dejean.

742 ALPESTRE Casteln. Trans. Roy. Soc., Victoria, VIII., p. 199.
Mountains of Victoria.

743 AUSTRALE Casteln. Trans. Roy. Soc., Victoria, VIII., p. 198.
Mountains of Victoria.

744 MONTANUM Casteln. Trans. Roy. Soc., Victoria, VIII., p. 198.
Dandenong Mountains ; Victoria.

745 TASMANICUM Casteln. Trans. Roy. Soc., Victoria, VIII., p. 199.
Tasmania.

746 THOUZETI Casteln. Trans. Roy. Soc., Victoria, VIII., p 198.
Rockhampton ; Queensland.

747 VICINUM Casteln. Trans. Roy. Soc., Victoria, VIII., p. 199.
Rockhampton ; Queensland.

AMBLYTELUS. Erichson.

748 AMPLIPENNIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 106.
Maryborough, Gayndah ; Queensland.

749 CURTUS Fabr. Syst. El., I., p. 202 ; Erichs. Weigm. Arch., 1842, I., p. 130, t. 4, f, 2.
Australia.

750 MINUTUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 106.
Gayndah ; Queensland.

751 VITTATUS Motsch. Bull. Mosc., 1864, IV., p. 304.
Australia.

MECYNOGNATHUS. Macleay.

752 DAMELII Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 336.
Cape York ; N. Australia.

PEDIOMORPHUS. Chaudoir.

753 PLANIUSCULUS Chaud. Bull. Mosc., 1878, LIII., p. 29.
Melbourne; Victoria.

DELINIUS. Westwood.

754 CASTELNAUI Chaud. Bull. Mosc., 1878, LIII., p. 34.
Australia.

755 ESSINGTONI Westw. Proc. Ent. Soc., 1864, p. 3.
Port Essington; N. Australia.

Sub-Family. FERONIDES.

ECCOPTOGENIUS. Chaudoir.

756 FERONIOIDES Casteln. Trans. Roy. Soc., Victoria, VIII
p. 201.
Deep Creek; Victoria.

ZEODERA. Casteln.

757 ATRA Casteln. Trans. Roy. Soc., Victoria, VIII., p. 200.
Clarence and Richmond Rivers; N. S. Wales.

CATADROMUS. W. S. Macleay.

758 AUSTRALIS Casteln. Etud. Ent., p. 154; Hist. Nat., 184
I., p. 120.
Australia. (Widely distributed).

759 CORDICOLLIS Motsch. Bull. Mosc., 1864, IV., p. 350, t. 2, f. 2
Australia.

760 ELSEYI White. Proc. Zool. Soc., 1859, p. 117, t. 58, f. 3.
Queensland.

761 LACORDAIREI Boisd. Voy. Astrol. Col., p. 34.
N. S. Wales; Victoria; S. Australia.

HOMALOSOMA. Boisduval.

762 CARBONICOLOR Motsch. Bull. Mosc., 1865, IV., p. 236.
Australia.

763 CORDATA Chaud. Bull. Mosc. 1865, III., p. 69.
Cunninghami Casteln. Trans. Roy. Soc., Victoria, VIII., p. 206.
Southern parts of Queensland.

764 CURTUM Chaud. Bull. Mosc., 1865, III., p. 78.
North Australia.

765 CYANEA Casteln. Hist. Nat., 1840, I., p. 113; Chaud. Bull. Mosc, 1865, III., p. 67.
episcopalis Casteln. Trans. Roy. Soc., Victoria, VIII., p. 204.
Lane Cove, Currajong, &c.; N. S. Wales.

766 CYANEOCINCTA Boisd. Voy. Astrol. Col., p. 67; Chaud. Bull. Mosc., 1869, III., p. 62.
Australia.

767 DILATICEPS Chaud. Bull. Mosc., 1865, III., p. 76.
Eastern Australia.

768 LÆVICOLLE Brullé. Hist. Nat., IV., p. 364.
Australia.

769 MARGINIFERA Chaud. Bull. Mosc., 1865, III., p. 68.
Wide Bay, Gayndah, &c.; Queensland.

770 PHILIPPI Newm. The Entomol., 1842, p, 401.
Victoria.

771 SEPTEMCOSTATA Chaud. Bull. Mosc., 1865, III., p. 572.
nitidicolle Casteln. Trans. Roy. Soc., Victoria, VIII., p. 206.

772 STRÍATOCOLLE Brullé. Hist. Nat. Ins., IV., p. 346.
Australia.

773 SUBVIRENS Chaud. Bull. Mosc., 1865, III., p. 72.
Australia.

774 SUPERBA Casteln. Trans. Roy. Soc., Victoria, VIII., p. 205.
Hunter River; N. S. Wales.

775 VIGORSI Gory. Fr. Ann., 1833, p. 233; Boisd. Voy. Astrol., 1835, p. 37; Chaud. Bull. Mosc., 1865, III., p. 70.
Australia.

776 VIOLACEA Casteln. Etud. Ent., p. 76.
North Australia. ?

777 VIRIDESCENS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 206.
Clarence River; N. S. Wales.

778 **Wilsoni** Casteln. Trans. Roy. Soc., Victoria, VIII., p. 205.
Brisbane ; Queensland.

TRICHOSTERNUS. Chaudoir.

779 **atlas** Casteln. Trans. Roy. Soc. Victoria, VIII., p. 203.
Homalosoma atlas Casteln.
Homalosoma Solandersi Casteln. Trans. Roy. Soc., Victoria, VIII., p. 204.
Homalosoma obesa Casteln. Trans. Roy. Soc., Victoria, VIII., p. 204.
Nurus brevis Motsch. Bull. Mosc., 1865, IV., p. 236.
Clarence and Richmond Rivers ; N. S. Wales.

780 **angulosus** Chaud. Bull. Mosc., 1878, LIII., p. 39.
Australia.

781 **Renardi** Chaud. Bull. Mosc., 1865, III., p. 71.
Homalosoma Hercules Casteln. Trans. Roy. Soc., Victoria, VIII., p. 205.
Moreton Bay, Wide Bay, &c. ; Queensland.

NURUS. Motschulsky.

782 **niger** Chaud. Bull. Mosc., 1878, LIII., p. 37.
Cape York ; N. Australia.

PRIONOPHORUS. Chaudoir.

783 **crenatipes.** Chaud. Bull. Mosc., 1865, III., p. 79.
Acinopus Australis Hope. Trans. Ent. Soc., 1845, IV., p. 105.
Secatophus Hopei Casteln. Trans. Roy. Soc., Victoria, VIII., p. 180.
South Australia.

MORPHNOS. Schaufuss.

784 **Flindersii** White. Proc. Zool. Soc., 1859, p. 117, t. 58, f. 2 ; Chaud., Bull. Mosc., 1865, III., p. 80 ; Casteln., Proc. Roy. Soc., Victoria, 1867, p. 91.
antipodus Schauf. Col. Heft., 1867, I., p. 65.
Sturti White. Proc. Zool. Soc., 1859, p. 117, t. 58, f. 1.
South Australia.

CRATOGASTER. Blanchard.

785 ATER Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 106.
Tibarisus ater Macleay.
Gayndah ; Queensland.

786 MELAS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 203.
Tibarisus melas Casteln.
Northern parts of N. S. Wales ; Queensland.

787 NIGER Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 107.
Tibarisus niger Macleay.
Gayndah ; Queensland.

788 ROBUSTUS Macleay. Proc. Linn. Soc., N. S. Wales, 1883, VIII., p. 414.
Tibarisus robustus Macleay.
Queensland.

789 SULCATA Blanch. Voy. Pole. Sud., IV., p. 33, t. 2, f. 11.
Northern Australia.

PARHYPATES. Motschulsky.

790 PROFUNDESTRIATUS Motsch. Bull. Mosc., 1865, IV., p. 263.
Australia.

791 TENUISTRIATUS Motsch. Bull. Mosc., 1865, IV., p. 262.
Australia.

NOTONOMUS. Chaudoir.

792 ACCEDENS Chaud. Bull. Mosc., 1865, III., p. 92.
Australia.

793 ÆNEOMICANS Chaud, Bull. Mosc., 1865, III., p. 84.
Feronia Lapeyrousei Casteln. Trans. Roy. Soc., Victoria, VIII., p. 213.
Hunter River ; N. S. Wales.

794 AMABILIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 215.
Merimbula ; N. S. Wales.

795 ANGUSTIPENNIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 109.
Gayndah ; Queensland.

796 AUBEI Casteln. Trans. Roy. Soc., Victoria, VIII., p. 215.
Hunter River ; N. S. Wales.

797 AUSTRALASIÆ Dej. Spec., III., p. 277 ; Chaud. Bull. Mosc., 1865, III., p. 87.
Omaseus Mitchelli Casteln. Trans. Roy. Soc., Victoria, VIII., p. 216.
New South Wales. Queensland. Victoria.

798 AZUREOMARGINATUS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 215.
Lachlan, and Hunter Rivers ; N. S. Wales.

799 CHALYBEUS Dej. Spec., III., p. 234 ; Chaud. Bull. Mosc., 1865, III., p. 90 ; Latrl. Dej. Cat., 3 ed., p. 38.
Percus bipunctatus Casteln. Trans. Roy. Soc., Victoria, VIII., p. 221.
New South Wales. Victoria. S. Australia.

800 CYANEOCINCTUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 108.
Gayndah ; Queensland.

801 DARLINGI Casteln. Trans. Roy. Soc., Victoria, VIII., p. 216.
Pine Mountains ; Queensland.

802 DEPRESSIPENNIS Chaud. Ann. Mus. Genov., 1874, VI., p. 585.
Cape York ; N. Australia.

803 DISCODERUS Chaud. Bull. Mosc., 1865, III., p. 87.
Australia.

804 DYSCOLOIDES Motsch. Bull. Mosc., 1865, IV., p. 263.
Neuropates dyscoloides Motsch.
Feronia Victoriæ Casteln. Trans. Roy. Soc., Victoria, VIII., p. 212.
Feronia semiviolacea Casteln. Trans. Roy. Soc., Victoria, VIII., p. 210.
Feronia subvilis Casteln. Trans. Roy. Soc., Victoria, VIII., p. 213.
Mountains of Gipps Land ; Victoria.

805 eques Casteln. Trans. Roy. Soc., Victoria, VIII., p. 207.
Illawarra; N. S. Wales.

806 Gippsiensis Casteln. Trans. Roy. Soc., Victoria, VIII., p. 208.
Mountains of Victoria.

807 gravis Chaud. Bull. Mosc., 1865, III., p. 90.
Percus montana Casteln. Trans. Roy. Soc., Victoria, VIII., p. 221.
Mountains of Gipps Land; Victoria.

808 Gippslandicus Casteln. Trans. Roy. Soc., Victoria, VIII., p. 211.
Mountains of Gippsland; Victoria.

809 Hunteriensis Casteln. Trans. Roy. Soc., Victoria, VIII., p. 213.
Hunter River; N. S. Wales.

810 impressipennis Casteln. Trans. Roy. Soc., Victoria, VIII., p. 214.
Clarence River; N. S. Wales.

811 incrassatus Chaud. Ann. Mus. Genov., 1874, VI., p. 583.
Sydney; N. S. Wales.

812 ingratus Chaud. Bull. Mosc., 1865, III., p. 87.
Australia.

813 Kingii Chaud. Bull. Mosc., 1865, III., p. 86.
Australia.

814 marginatus Casteln. Hist. Nat., 1838, I., p. 105.
Pœcilus marginatus Casteln.
Australia.

815 mediosulcatus Chaud. Bull. Mosc., 1865, III., p. 88.
Omaseus occidentalis Casteln. Trans. Roy. Soc., Victoria, VIII., p. 220.
Adetipa punctata Casteln. Trans. Roy. Soc., Victoria, VIII., p. 157.
Clarence River, N. S. Wales. K. G. Sound; W. Australia.

816 miles Casteln. Trans. Roy. Soc., Victoria, VIII., p. 208
Clyde River; N. S. Wales.

817 molestus Chaud. Bull. Mosc., 1865, III., p. 89.
Ternox obsoletus Motsch. Bull. Mosc., 1865, IV., p. 268.
Percus lacustris Casteln. Trans. Roy. Soc., Victoria, VIII., p. 222.
South Australia; Victoria.

818 nitidicollis Chaud. Bull. Mosc., 1865, III., p. 89.
Feronia impressicollis Casteln. Trans. Roy. Soc., Victoria, VIII., p. 212.
Steropus Mastersi Casteln. Trans. Roy. Soc., Victoria, VIII., p. 224.
New South Wales; Queensland; S. Australia.

819 opacicollis Chaud. Bull. Mosc., 1865, III., p. 88.
Feronia purpureolimbatus Casteln. Trans. Roy. Soc., Victoria, VIII., p. 214.
Orbitus purpuripennis Motsch. Bull. Mosc., 1865, IV., p. 248.
Clarence River; N. S. Wales.

820 opulentus Casteln. Trans. Roy. Soc., Victoria, VIII., p. 210.
Feronia auricollis Casteln. Trans. Roy. Soc., Victoria, VIII., p. 211.
Mountains of Victoria.

821 parallelomorpha Chaud. Bull., Mosc., 1878, LIII., p. 57.
Queensland.

822 Peronii Casteln. Trans. Roy. Soc., Victoria, VIII., p. 209.
Feronia Plutus Casteln. Trans. Roy Soc., Victoria, VIII., p. 209.
Feronia Croesus Casteln Trans. Roy. Soc., Victoria, VIII., p. 209.
Mountains of Victoria.

823 Phillipsi Casteln. Trans. Roy. Soc., Victoria, VIII., p. 212.
Mountains of Victoria.

824 politulus Chaud. Bull. Mosc,, 1865, III., p. 86.
Feronia Tasmanicus Casteln. Trans. Roy. Soc., Victoria, VIII., p. 210.
Tasmania.

825 PRISTONYCHOIDES Motsch. Bull, Mosc., 1865, IV., p. 263.
Neuropates pristonychoides Motsch.
Australia.

826 PURPUREIPENNIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 107.
Gayndah ; Queensland.

827 REGALIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 207.
Kurrajong, Illawarra ; N. S, Wales.

828 RESPLENDENS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 213.
Merimbula ; N. S. Wales.

829 SATANUS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 221.
Omaseus satanus Casteln.
King George's Sound ; W. Australia.

830 SATRAPA Casteln. Trans. Roy. Soc., Victoria, VIII., p. 208.
Gippsland ; Victoria.

831 SIMULANS Chaud. Ann. Mus. Genov., 1874, VI., p. 586.
South Australia.

832 SPHODROIDES Dej. Spec., III., p. 236 ; Chaud. Bull. Mosc., 1865. III., p. 91.
Australia.

833 SUBIRIDESCENS Chaud. Bull. Mosc., 1865, III., p. 85.
Melbourne ; Victoria.

834 SUBOPACUS Chaud. Ann. Mus. Genov., 1874, VI., p. 586.
Clarence River ; N. S. Wales.

835 TRIPLOGENIOIDES Chaud. Bull. Mosc., 1865, III., p. 85.
Feronia ducalis Casteln. Trans. Roy. Soc., Victoria, VIII., p. 207.
Illawarra ; N. S. Wales.

836 TUBERICAUDA H. W. Bates. Cist. Ent., 1878, II., p. 323.
Tasmania.

837 VARIICOLLIS Chaud. Bull. Mosc., 1865, III., p. 86.
Feronia comes Casteln. Trans. Roy. Soc., Victoria, VIII., p. 207.
Clyde River ; N. S. Wales.

838 VIOLACEOMARGINATUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 108.
Gayndah; Queensland.

839 VIRIDICINCTUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 108.
Gayndah; Queensland.

840 VIRIDILIMBATUS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 215.
Feronia viridimarginatus Casteln. Trans. Roy. Soc., Victoria, VIII., p. 216.
Brisbane; Queensland.

PROSOPOGMUS. Chaudoir.

841 ARNHEIMENSIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 220.
Omaseus Arnheimensis Casteln.
Arnheim's Land; N. Australia.

842 BOISDUVALLI Casteln. Trans. Roy. Soc., Victoria, VIII., p. 222.
Abax Boisduvalli Casteln.

843 FUNEBRIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 219.
Pœcilus funebris Casteln.
Mount Gambier.

844 HARPALOIDES Chaud. Ann. Mus. Genov., 1874, VI., p. 593.
New South Wales.

845 INTERIORIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 218.
Pœcilus interioris Casteln.
Paroo River; Central Australia.

846 IRIDESCENS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 218.
Pœcilus iridescens Casteln.
Clarence River; N. S. Wales. Rockhampton; Queensland.

847 REICHEI Casteln. Trans. Roy. Soc., Victoria, VIII., p. 222.
Abax Reichei Casteln.
Kiama; N. S. Wales.

848 RUFIPALPIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 216.
Omaseus rufipalpis Casteln.
Mountains of Victoria.

849 STRIATICOLLIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 214.
Feronia striaticollis Casteln.
Clarence River; N. S. Wales.

850 WILCOXI Casteln. Trans. Roy. Soc., Victoria, VIII., p. 212.
Feronia Wilcoxi Casteln.
Clarence River; N. S. Wales.

RHABDOTUS. Chaudoir.

851 DIEMENENSIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 210.
Feronia Diemenensis Casteln.
Tasmania.

852 FLORIDUS H. W. Bates. Cist. Ent., 1878, II., p. 322.
Tasmania.

LOXODACTYLUS. Chaudoir.

853 AMÆROPTERA Chaud. Bull. Mosc,, 1865, II., p. 97.
Australia.

854 CARINULATA Chaud. Bull. Mosc., 1865, II., p. 96.
Feronia Dingo Casteln. Trans. Roy. Soc., Victoria, VIII., p. 206.
Feronia yarræ Casteln. Trans. Roy. Soc., Victoria, VIII., p. 206.
Mountains of Victoria.

SARTICUS. Motschulsky.

855 AUBEI Casteln. Trans. Roy. Soc., Victoria, VIII., p. 215.
Feronia Aubei Casteln.
Hunter River; N. S. Wales.

856 AZUREOMARGINATA Casteln. Trans. Roy. Soc., Victoria, VIII., p. 215.
Pterostichus azureomarginata Casteln.
Lachlan and Hunter Rivers; N. S. Wales.

857 CYCLODERA Chaud. Bull. Mosc., 1865, III., p. 100.

Steropus Waterhousii Casteln. Trans. Roy. Soc., Victoria, VIII., p. 224.

Steropus Mastersi Casteln. Trans. Roy. Soc., Victoria, VIII., p. 224.

Steropus Blagravi Casteln. Trans, Roy. Soc., Victoria, VIII., p. 224.

South, and Western Australia.

858 DISCOPUNCTATA Chaud. Bull. Mosc., 1865, III., p. 97.

Steropus Germari Casteln. Trans. Roy. Soc., Victoria VIII., p. 222.

Steropus Bonvouloiri Casteln. Trans. Roy. Soc., Victoria, VIII., p. 223.

Sarticus ovicollis Motsh. Bull. Mosc., 1865, II., p. 266.

Brisbane; Queensland. Adelaide; S. Australia.

859 ISCHNA Chaud. Bull. Mosc., 1878, LIII., p. 68.
North Australia.

860 LESUEURI Casteln. Trans. Roy. Soc., Victoria, VIII., p. 210.
Feronia Lesueuri Casteln.

Illawarra; N. S. Wales.

861 OBESULA Chaud. Bull. Mosc. 1865., III., p. 99.

Sarticus orbicollis Motsh. Bull. Mosc., 1865, IV., p. 266.

Steropus saphyripennis Casteln. Trans. Roy. Soc., Victoria, VIII., p. 223.

Steropus esmeraldipennis Casteln. Trans. Roy. Soc., Victoria, VIII., p. 223.

Steropus Olivieri Casteln, Trans. Roy. Soc., Victoria, VIII., p. 223.

Steropus Rockhamptonensis Casteln. Trans. Roy. Soc., Victoria, VIII., p. 223.

South Australia. Victoria. Rockhampton; Queensland.

862 QUADRISULCATA Chaud. Bull. Mosc., 1878, LIII., p. 67.
North Australia.

863 SAPHYREOMARGINATA Casteln. Trans. Roy. Soc., Victoria, VIII., p. 222.
Steropus saphyreomrginata Casteln.
Steropus cyaneocincta Chaud. Bull. Mosc., 1865, III., p. 97.
Gayndah ; Queensland. Melbourne ; Victoria.

STEROPUS. Megerle.

864 CIVILIS Germ. Linn. Ent., 1848, III., p. 167 ; Chaud. Bull. Mosc., 1865, III., p. 99.
South Australia.

865 ELEGANTULUS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 224.
King George's Sound ; W. Australia.

866 IRIDITINCTUS Chaud. Bull. Mosc., 1865, III., p. 100.
Swan River ; W. Australia.

RHYTISTERNUS. Chaudoir.

867 CYATHODERA Chaud. Bull. Mosc., 1865, III., p. 107.
Omaseus Lachlandiensis Casteln. Trans. Roy. Soc., Victoria, VIII., p. 219.
Lachlan River ; N. S. Wales.

868 LÆVILATERA Chaud. Bull. Mosc., 1865, II., p. 107.
Omaseus centralis Casteln. Trans. Roy. Soc., Victoria, VIII., p. 220.
Darling River ; N. S. Wales,

869 LIOPLEURA Chaud. Bull. Mosc., 1865, II., p. 106.
Amastus nigricolor Motsch. Bull. Mosc., 1865, VII., p. 246.
Australia.

870 MASTERSI Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 109.
Gayndah ; Queensland.

871 MISERA Chaud. Bull. Mosc., 1865, II., p. 108.
Omaseus subcarbonarius Casteln. Trans. Roy. Soc., Victoria, VIII., p. 220.
New South Wales. Victoria

872 PLEBEIA Chaud. Ann. Mus. Genov., 1874, VI., p. 598.
Mount Victoria ; N. S. Wales.

873 PUELLA Chaud. Bull. Mosc., 1865, II., p. 108.
Omaseus Clarenciensis Casteln. Trans. Roy. Soc., Victo
VIII., p. 220.
Clarence River; N. S. Wales.

CENEUS. Chaudoir.

874 CHALYBEIPENNIS Chaud. Bull. Mosc., 1865, II., p. 109
Pterostichus coracinus Erich. Weigm. Arch., 1842, p. 148.
Pterostichus viles Casteln. Trans. Roy. Soc., Victor
VIII., p. 212.
Mountains of Victoria.

875 SUSPECTA Chaud. Bull. Mosc., 1878, LIII., p. 54.
Queensland.

EURYSTOMIS. Chaudoir.

876 CASTELNAUI Chaud. Bull. Mosc., 1878, LIII., p. 48.
Queensland.

NELIDUS. Chaudoir.

877 AUSTRALIS Chaud. Bull. Mosc., 1878, LIII., p. 50.
Paroo River; Central Australia.

CHLAENIOIDIUS. Chaudoir.

878 HERBACEA Chaud. Bull. Mosc., 1865, II., p. 111.
Pœcilus resplendens Casteln. Trans. Roy. Soc., Victor
VIII., p. 217.
Lachlan, Darling, and Paroo Rivers.

879 PLANIPENNIS Macleay. Trans. Ent. Soc., N. S. Wales, 18
II., p. 109.
Gayndah; Queensland.

880 PŒCILOIDES Chaud. Bull. Mosc., 1878, LII., p. 57.
Queensland.

881 PROLIXA Erichs. Weigm. Arch., 1842, I., p. 127; Cha
Bull. Mosc., 1865, III., p. 110,
Tasmania. N. S. Wales.

LEPTOPODUS. Chaudoir.

882 HOLOMELANUS Germ. Linn. Ent., 1848, III., p. 167.
Argutor holomelanus Germ.
South Australia.

883 IRIDIPENNIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 217.
Pœcilus iridipennis Casteln.
New South Wales. Victoria. S. Australia.

884 SUBGAGATINA Casteln. Trans. Roy. Soc., Victoria, VIII., p. 218.
Pœcilns subgagatinus Casteln.
Pterostichus solicitus Erichs. Weigm. Arch., 1842, I., p. 128.
Pine Mountain ; Queensland. Tasmania.

LOXANDRUS. Leconte.

885 ATRONITENS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 110.
Pœcilus atronitens Macleay.
Gayndah ; Queensland.

886 GAGATINUS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 218.
Pœcilus gagatinus Casteln.
Tasmania.

887 RUFILABRIS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 219.
Pœcilus rufilabris Casteln.
Pine Mountain ; Queensland.

888 SUBIRIDESCENS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 110.
Pœcilus subiridescens Macleay.
Gayndah; Queensland.

ABAX. Bonelli.

889 SULCIPENNIS Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 368.
Richmond River ; N. S. Wales.

CORONOCANTHUS. Macleay.

890 SULCATUS Macleay. Proc. Linn. Soc., N. S. Wales, 1878, II., p. 216.
Port Darwin ; North Australia.

OPHRYOSTERNUS. Chaudoir.

891 SULCATULUS Chaud. Bull. Mosc., 1873, XLVII., p. 115.
Moreton Bay ; Queensland.

PŒCILUS. Bonelli.

892 KINGII W. S. Macleay. King. Survey. Austral., 1827, II., p. 438.
Australia.

893 LÆVIS Macleay. Proc. Linn. Soc., N. S. Wales, 1883, VIII., p. 414.
Port Darwin ; N. Australia.

894 SEMIPLICATUS Casteln. Hist. Nat., I., p. 105.
Australia.

PLATYSMA. Bonelli.

895 MONOCHROUM Chaud. Bull. Mosc., 1865, IV., p. 246.
Melbourne ; Victoria.

PACHIDIUS. Chaudoir.

896 SULCATUS Chaud. Bull. Mosc., 1865, III., p. 82.
Moreton Bay ; Queensland.

CYRTODERUS. Hope.

897 AUSTALASIÆ Hope. Proc. Ent. Soc., 1841, p. 47 ; Ann. Nat. Hist, 1842, IX., p. 427.
Australia.

SIMODONTUS. Chaudoir.

898 CONVEXUS Chaud. Bull. Mosc., 1873, XLVII., p. 112.
Melbourne ; Victoria.

899 CURTULUS Chaud. Bull. Mosc., 1873, XLVII., p. 113.
Melbourne ; Victoria.

900 ELONGATUS Chaud. Bull. Mosc., 1873, XLVII., p. 111.
South Australia.
901 FOVEIPENNIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 110.
Gayndah ; Queensland.
902 NITIDIPENNIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 111.
Gayndah ; Queensland.
903 OODIFORMIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 111.
Gayndah ; Queensland.
904 ORTHOMOIDES Chaud. Bull. Mosc., 1873, XLVII., p. 111.
Melbourne ; Victoria.
905 SEXFOVEATA Chaud. Bull. Mosc., 1873, XLVII., p. 111.
Queensland.
906 TRANSFUGA Chaud. Bull. Mosc., 1873, XLVII., p. 112.
Melbourne ; Victoria.

ARGUTOR. Megerle.

907 ÆNEIPENNIS Chaud. Bull. Mosc., 1843, III., p. 414.
Australia.
908 ANTIPODUS Motsch. Bull. Mosc., 1865, IV., p. 257.
Australia.
909 AUSTRALIS Dej. Spec., III., p. 262.
Australia.
910 INEDITUS Casteln. Trans. Roy. Soc., Victoria, VIII., p. 225.
Pine Mountain ; Queensland.

Sub-Family. ANCHOMENIDES.

DICROCHILE. Guérin.

911 BREVICOLLIS Chaud. Bull. Mosc., 1852, I., p. 68.
New South Wales. Victoria. S. Australia.
912 GIGAS Casteln. Trans Roy. Soc., Victoria, VIII., p. 152.
Northern parts of N. S. Wales; Southern parts of Queensland.

913 Goryi Boisd. Voy. Astrol., Col., p. 32.
anchomenoides Guér. Ann. Fr., 1846; Bull., p. 103; Chaud. Bull. Mosc., 1852, I., p. 69; Lacord. Gen. Atl., t. 11, f. 6, a.
Stomatocœlus licinoides Macleay. Trans. Ent. Soc., N. S. Wales, 1863, I., p. 116.
Australia. (Widely distributed).

914 minuta Casteln. Trans. Roy. Soc., Victoria, VIII., p. 154.
Victoria; Tasmania.

915 montana Casteln. Trans. Roy. Soc., Victoria, VIII., p. 153,
Yankee Jim Creek; Victoria.

916 punctatostriata Casteln. Trans. Roy. Soc., Victoria, VIII., p. 153.
Melbourne; Victoria.

917 punctipennis Casteln. Trans. Roy. Soc., Victoria, VIII., p. 153.
Brisbane; Queensland.

918 quadricollis Casteln. Trans. Roy. Soc., Victoria, VIII., p. 153.

SIAGONYX. Macleay.

919 amplipennis Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 113.
Gayndah; Queensland.

920 Mastersi Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 113.
Gayndah; Queensland.

LESTIGNATHUS. Erichson.

921 cursor Erichs. Wiegm. Arch., 1842, I., p. 134, t. 4, f. 3, a-b.
Tasmania.

922 Simsoni H. W. Bates. Cist. Ent., 1878, II., p. 323.
Tasmania.

PLATYNUS. Bonelli.

923 ambiguus Erichs. Weigm. Arch.,' 1842, I., p. 130.
Tasmania.

924 LOPHOIDES Chaud. Bull. Mosc., 1854, I., p. 135.
Melbourne ; Victoria.
925 MARGINELLUS Erichs. Weigm. Arch., 1842, I., p. 130.
Tasmania. Victoria.
926 MARGINICOLLIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 112.
Gayndah ; Queensland.
927 NIGRO-ÆNEUS Newm. The Entomol., 1842, p. 402.
Australia.
928 NITIDIPENNIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 111.
Gayndah ; Queensland.
929 PLANIPENNIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 112.
Gayndah ; Queensland.

COLPODES. W. S. Macleay.

930 AUSTRALIS Erichs. Weigm. Arch., 1842, I., p. 131.
Tasmania.
931 DILATATUS Erichs. Weigm. Arch., 1842, I., p. 131.
Tasmania.
932 LUGUBRIS Motsch. Bull. Mosc., 1864, IV., p. 309.
Australia.

Sub-Family. POGONIDES.

POGONUS. Dejean.

933 AUSTRALIS Chaud. Bull. Mosc., 1878, LIII., p. 76.
Melbourne ; Victoria.
934 CARDIOTRACHILUS Chaud. Bull. Mosc., 1871, XIV., p. 24.
Eastern Australia.

TRECHUS. Clairville.

935 ATER Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 114.
Gayndah ; Queensland.

936 ATRICEPS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 113.
Gayndah ; Queensland.

937 CONCOLOR Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 114.
Gayndah ; Queensland.

938 DIEMENENSIS H. W. Bates. Cist. Ent., 1878, II., p. 322.
Tasmania.

939 RUFILABRIS Macleay. Trans. Ent. Soc., N S. Wales, 1871, II., p. 114.
Gayndah ; Queensland.

ILLAPHANUS. Macleay.

940 STEPHENSI Macleay. Trans. Ent. Soc., N. S. Wales, 1864, p. 156.
Wollongong; N. S. Wales.

Sub-Family. BEMBIDIIDES.

TACHYS. Schaum.

941 AUSTRALIS Schaum. Berl. Zeit., 1863, p. 90.
Australia.

TACHYTA. Kirby.

942 LIVIDA H. W. Bates. Ent. Month. Mag., 1871, p. 13.
Adelaide ; S. Australia.

BEMBIDIUM. Erichson.

943 AMPLIPENNE Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 119.
Gayndah ; Queensland.

944 ATRICEPS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 116.
Gayndah ; Queensland.

945 BIFOVEATUM Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 117.
Gayndah ; Queensland.

946 BIPARTITUM Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 120.
Gayndah ; Queensland.

947 BIPUSTULATUM Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 116.
Gayndah ; Queensland.

948 BISTRIATUM Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 115.
Gayndah ; Queensland.

949 BRUNNIPENNE Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 118.
Gayndah ; Queensland.

950 CONVEXUM Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 115.
Gayndah ; Queensland.

951 FLAVIPES Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 119.
Gayndah ; Queensland.

952 GAGATINUM Macleay. Trans. Ent. Soc., N. S. Wales, 1871, p. 119.
Gayndah ; Queensland.

953 JACKSONIENSE Guér. Voy. Coquille, 1830, p. 61, t. 1, f. 17.
Sydney ; N. S. Wales.

954 OVATUM Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 117.
Gayndah ; Queensland.

955 PUNCTIPENNE, Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 116.
Gayndah ; Queensland.

956 RUBICUNDUM Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 118.
Gayndah ; Queensland.

957 SEXSTRIATUM. Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 117.
Gayndah ; Queensland.

958 STRIOLATUM Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 115.
Gayndah ; Queensland.

959 SUBVIRIDE Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 118.
Gayndah ; Queensland.

960 TRANSVERSICOLLE Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 116.
Gayndah ; Queensland.

DESCRIPTIONS OF THREE NEW FISHES FROM PORT JACKSON.

By J. Douglas-Ogilby,

Senior Assistant Zoologist, Australian Museum.

Scyllium anale. sp. nov.

The space between the eyes is greater than that between the tip of the snout and the anterior margin of either eye. Nasal valves not confluent, destitute of a cirrus; nostrils nearer to the mouth than to the snout. A short labial fold round either angle of the mouth. Teeth in several rows in both jaws, each with a short lateral cusp on either side; behind those of the lower jaw is a band of short fringed cirri. Gill-openings of moderate size, the last smallest; the two last situated above the base of the pectoral. The first dorsal has its origin at the middle of the total length, and is equal in size to the second. The anal ends rather behind the origin of the second dorsal, than which it is much larger, its base being $1\frac{2}{3}$ of the base of that fin; and the interspace between the end of its base and the origin of the caudal is but $\frac{2}{3}$ of the base itself. Ventrals a little in advance of the first dorsal; their outer and posterior margins form a very acute angle. Lower caudal lobe large; posterior lobe obliquely truncated behind.

Body and fins stone-color; the upper parts are ornamented with nine large sub-circular brown blotches, each of which has a marginal series of round deep-brown spots, and often a central spot. The sides are similarly, but more faintly blotched and spotted; these lateral blotches being for the most part placed opposite to the interspaces between those of the dorsal. The two cranial blotches are drawn out laterally, and are also joined together by a broad densely spotted band. The lower parts are dirty white.

The example, from which the above description was taken, was trawled in Middle Harbour on the 22nd ult., and is an adult male, measuring 22½ inches. The species under consideration bears considerable similarity to the *Scyllium bürgeri* of Müller and Henle, but the greater size of the spots, the pattern of coloration, and the much larger and differently shaped anal fin distinguish it from that species at a glance.

Registered number of type in the Australian Museum, B. 8,44[illegible]7.

Heliastes immaculatus. sp. nov.

D. 13/17. A. 2/14. V. 1/5. P. 18. C. 15. L. lat. 28. L. trans. 4/12.

Length of head about 4, of caudal fin 4⅓ to 4⅔, height of body 2⅖ in the total length. Diameter of the eye ⅓ of the length of head, equal to that of the snout, and of the interorbital space, which latter is convex and rather swollen. Jaws equal. The maxilla does not quite reach to the anterior margin of the eye; its front edge is strongly arched inwards. Greatest width of the pre-orbital half a diameter of the eye. Teeth in the jaws in a single series, conical. Dorsal fin commences somewhat in front of the vertical from the end of the operculum; its 4th spine is the longest, about ½ the length of the head; the 5th to 9th rays longest, much longer than the spines. The anal commences beneath the 12th dorsal spine; its second spine is stronger and longer than any of the dorsal spines. Outer ventral ray elongate, longer than the head, and reaching to behind the anal spines. Pectorals rather less than length of head. Caudal forked. The scales extend in front of the eyes, and for more than half the height between the dorsal spines: eight longitudinal series on each cheek.

Ground color pale olive-green above, silvery below, the sides with a bronzy wash. The scales on the lateral line are darker, giving an appearance of a faint band. The vertical fins have a violet tinge, and are narrowly edged with pale blue.

The description is taken from a specimen trawled on Shark Reef, where several examples have been obtained during the last two months; none of them exceed six inches in length. Registered number of type in the Australian Museum collection, B. 7,452.

PEMPHERIS LINEATUS. sp. nov.

B. VII. D. 5/12. A. 3/35. V. 1/5. P. 17. C. 17. L. lat. 58.

Length of head $4\frac{1}{10}$, of caudal fin $4\frac{1}{2}$, height of body below first dorsal spine $2\frac{9}{10}$ in the total length. Eyes very large and prominent, diameter of each $\frac{1}{2}$ of the length of head. Snout short, $\frac{3}{7}$ of diameter of eye, its profile concave. Interorbital space rather convex, $\frac{1}{2}$ of diameter of eye; jaws equal when closed; cleft of mouth oblique; maxillary reaches to behind middle of eye. A moderately strong spine, with a pair of smaller ones on either side, at the pre-opercular angle. Both jaws with narrow bands of villiform teeth, the outer row of which is enlarged; a few much stronger teeth, on either side of the symphyses, and pointing directly forwards; narrow bands on the palatines, and an obtusely-angular band on the vomer. Dorsal spines weak, the last the longest, not nearly so long as the anterior rays, and equal to the distance between the tip of the snout and the hind margin of the eye: anal commences beneath the 9th dorsal ray; its rays are longest anteriorly. The pectoral fin is scarcely the length of the head. Ventrals reach to beyond the origin of the anal fin: caudal forked. Scales of the body moderate; those of the head, and back to the origin of the dorsal, small; anal and caudal scaly. Lateral line with an upward curve to beneath the dorsal spines, whence it runs straight with a downward slant to the fork of the caudal.

Bright golden-brown washed with purplish-bronze; nine lighter-colored longitudinal narrow bands on the sides, parallel to the lateral line.

A single specimen measuring $7\frac{1}{2}$ inches, trawled on Shark Reef during the month of July forms the type of this handsome and very distinct species. Registered number in the Australian Museum collection, B. 7,334.

NOTES AND EXHIBITS.

Dr. Cox exhibited a Cup made of Cocoanut, which had been used for baling Kava out of the large bowl in which it is mixed. The interior was from long use coated with a thin, bright, and iridescent surface, corresponding to the thick porcellanous deposit which lines the larger vessels.

Mr. Prince exhibited a fine specimen, 10 inches in diameter, of the nidamentary capsule or "shell" of *Argonauta nodosa*, var. *pacifica*, washed ashore at Manly. Also a large Orange Cowrie, *Cypræa aurantia*, 4½ inches in length, from Fiji.

Surgeon-Major Williams exhibited a collection of arms and implements from the Soudan, including javelins, shield of hippopotamus hide, curved and double-edged knives of fine steel, a throwing stick like the Australian "fighting boomerang," camel-sticks for driving, hats, rosaries always of 33 pieces, phylacteries containing a verse of the Koran and worn round arm or neck, a purse, and a sort of skewer used as a comb.

Mr. MacMahon exhibited specimens of highly micaceous sandstone from North Shore.

Mr. Macleay exhibited a fine specimen of a Carboniferous fossil, *Aviculopecten*, found on the beach at Double Bay, and supposed [illegible] have been dropped there by a previous possessor.

Mr. Macleay also exhibited a section of a branch of an Orange Tree, completely perforated by the larva of a longicorn beetle. Al[illegible] three specimens of a beetle found in the perforated wood. Th[illegible] exhibit had been sent by Mr. M. de Meyrick, a Member of th[illegible] Society, who stated that many Orange trees had suffered in th[illegible] same way in the neighbourhood of Penrith. Mr. Macleay sa[illegible] the injury was caused by the larva of *Monohammus fistulato*[illegible] a grub destructive to all kinds of fruit trees, but as far as his exp[illegible]rience went its ravages were confined to old or decaying trees, an[illegible] it would be interesting to know if in any instance it had been found to attack young and vigorous plants. The accompanying beetles were Heteromerous Insects of the genus *Amarygmus*, and were not in any way the cause of the injury to the tree.

Mr. Brazier exhibited specimens of the following rare shells, *Paryphanta Hochstetteri*, *Trophon Cheesemani*, *Pisania flavescens*, and *Patinella flava* from New Zealand. Also two specimens of an *Astreopora* from Garden Island, Port Jackson.

Mr. Ramsay exhibited specimens of *Menura Victoriæ*, male and female, with nest and egg, from Port Phillip.

Mr. Douglas-Ogilby exhibited specimens of the fishes described in his paper.

Mr. A. Sidney Olliff exhibited specimens and sk etches of *Cryptommatus Jansoni*, Matt., a curious beetle which was found under the fur of the common rat in Tasmania, and said that he believed new and interesting species with similar habits might be found in Australia if the smaller mammals were examined when freshly killed. Two allied species were known from Peru, one of which was found in the fur, and also in the nests of mice. The specimens exhibited were captured by Mr. A. Simson and had been obtained from Mr. Morton of the Hobart Museum.

WEDNESDAY, 30TH SEPTEMBER,

The President, Professor W. J. Stephens, M.A., F.G.S., in the chair.

Mr. Septimus Lindley was introduced as a visitor.

MEMBER ELECTED.

Mr. Marriott Woodhouse.

DONATIONS.

"Abstract of Proceedings of the Royal Society of Tasmania." August 11th, 1885. From the Society.

"The Johns Hopkins University Circulars." Vol. IV., No. 41. July, 1885. From the University.

"Journal of the Cincinnati Society of Natural History." Vol. VIII., No. 2. July, 1885. From the Society.

"Science." Vol. VI., Nos. 126-132. From the Editor.

"Report of Progress of the Geological and Natural History Survey and Museum of Canada." 1882-1884, with maps. "Catalogue of Canadian Plants." Part II. Gamopetalæ. From the Geological and Natural History Survey and Museum of Canada.

"Zoologischer Anzeiger." VIII. Jahrg, Nos. 200, 201, 202. From the Editor.

"Report of the Trustees of the Public Library, Museums and National Gallery of Victoria." 1884. From the Trustees.

"Bulletin de la Société Royale de Géographie d'Anvers." Tome IX., 6th Fascicule, 1885. From the Society.

"Transactions of the Entomological Society of New South Wales." Vol. I., Parts 2 and 3, 1864. "Transactions of the Zoological Society of London." Vol. V., Part 5; Vol. VI., Parts 1, 2, 4-8; Vol. VII., Parts 1-5; Vol. IX., Parts 7-10; Vol. X., Part 2. "Transactions of the Entomological Society of London." 3rd Series, Vol. I., Parts 1-6. "Journal of the Linnean Society." Zoology, Vol. XI., Nos. 53-56; Vol. XII., Nos. 58-64; Vol. XIII., Nos. 65-72; Vol. XIV., Nos. 73-4. Botany, Vol. XIII., Nos. 66-72; Vol. XIV., Nos. 75-9; Vol. XV., Nos. 82, 84-8; Vol. XVI., Nos. 89-97. "Transactions." Vol. XXVI., Part 4; Vol. XXVII., Part 1. "Vegetation of the Chatham Islands." By Baron F. von Mueller, K.C.M.G. "Monografia del Genere Notidanus." By Robert Lawley. "On the Structure and Developement of Peripatus capensis." By H. N. Moseley, M.A. "On the Structure and relations of the Alcyonarian Heliopora cœrulea, with some account of the Anatomy of a species of Sarcophyton,—Notes on the structure of species of the genera Millepora, Pocillipora and Stylaster, and Remarks on the affinities of certain Palæozoic Corals." By H. N. Moseley, M.A. "Certain vegetable organisms found in coal from Fordel." By J. H. Balfour, M.D., F.L.S. From Dr. James C. Cox, F.L.S.

"Mémoires de la Comité Geologique à St. Peterbourg. Vol. I., Nos. 1-4. Vol. II., No. 1, 1883-5. Bulletins 1883-5. From the Director.

"Catalogue of Books added to the Radcliffe Library, Oxford University, during the year 1884. From the Oxford University Museum.

"Victorian Naturalist." Vol. II., No. 5, September, 1885. From the Field Naturalist's Club of Victoria.

"The Provincial Medical Journal." Vol. IV., No. 44. From the Editor.

"Feuille des jeunes Naturalistes." No. 178. From the Editor.

"Abstract of Proceedings of the Royal Society of Tasmania." September, 1885. From the Editor.

"Systematic Census of Australian Plants." By Baron Ferd. von Mueller, K.C.M.G. Second Annual Supplement (for 1884). From the Author.

"Memoirs of the California Academy of Sciences." Vol. I., Parts 1 and 2. "Catalogue of Pacific Coast Fungi." "Proceedings." Vols. I., II., IV., V., VI., VII. Part 1. From the Society.

"Catalogue of the Australian Hydroid Zoophytes." By W. M. Bale. From the Trustees of the Australian Museum.

"Bulletin of the Museum of Comparative Zoology at Harvard College Cambridge (Mass.)." Vol. XI., No. 11, Vol. XII, No. 1. From the Museum.

PAPERS READ.

REMARKS ON THE DECAY OF CERTAIN SPECIES OF EUCALYPTI.

By K. H. Bennett, Esq.

In a recent issue of the *Sydney Mail*, I noticed mention of a paper lately read by the Rev. Peter McPherson at a Meeting of the Royal Society, on the decay of our Forest Trees, and I observe, that gentleman advances the theory that this decay is caused by the opossums.

From personal observation on this subject I am convinced that to a great extent, at any rate—such is the case. The portion of the neighbouring Colony of Victoria (Gipps Land) in which I resided some five and twenty years ago, at that time swarmed with these animals. Some idea of their numbers may be formed when I state that just before I left that locality I knew of a party of four men, who undertook to procure a quarter of a million skins, and I subsequently heard from a friend who still resides there that they obtained the required number in a comparatively short time. The increase in the numbers of opossums had been going on for some years prior to the period of which I speak, in consequence of the great decrease in the numbers of the natives who were formerly very numerous, and these animals formed their chief article of food. It was not until the opossums had become exceedingly plentiful that their injurious effect on the trees was apparent to any great extent, and my attention was drawn to the dead and dying Eucalypts; the cause I soon discovered to be the opossums and I noticed that almost without exception the trees attacked were either Red Gum, *E. rostrata* or Yellow Box, *E. mellidora.*

From my observations it appeared to me that at certain periods of the year, the leaves of one or other of these trees became more palatable to the opossums and they would resort night after night to one or more of them in numbers, (I have counted over 30 at one time) until almost all the leaves were devoured, and what few remained were jagged and mutilated. The opossums would then seek fresh trees, and in the course of a month or so, the first ones would throw out a profusion of tender shoots which would again attract the opossums until the whole were eaten off and so on for some two or three months, the growth of shoots becoming less each time, until the tree succumbed and died of exhaustion.

The side of the tree up which the opossum ascended (always the same) would be deeply furrowed by their claws, the branches stained, and in fact the whole tree strongly impregnated with the fœtid odour of the urine of these animals, which it is possible may also have had an injurious effect on the trees. As far back as the period I have mentioned hundreds of trees were killed from the above cause, and the effect, then unnoticed by the casual observer in the boundless expanse of forest, has in the course of years become apparent to everyone. As I before remarked it was chiefly *E. rostrata* and *E. mellidora* that were attacked, and I have since seen numbers of the same trees, in N. S. Wales killed from the same cause, whilst it is worthy of mention that although both are plentiful in the vicinity of Melbourne, none are observed to die there in a similar manner, which I am of opinion is due to the fact that there are no opossums there.

DOUBLE FLOWERS.

By Rev. W. Woolls, Ph.D., F.L S.

Mr. Bentham, in his introduction to the *Flora Australiensis*, remarks that "*Double Flowers* are in most cases an accidental deformity or monster in which the ordinary number of petals is multiplied by the conversion of stamens, sepals, or even carpels into petals, by the division of ordinary petals, or simply by the addition of supernumerary ones." Whatever may be the cause of the phenomenon (whether from the influence of cultivation, hybridization through the agency of insects, or atmospheric changes), such flowers are highly esteemed by florists, not merely on account of their size and showiness, but because they produce their flowers annually without any diminution of what is considered their beauty. This arises from the fact that the plants are not weakened by the ripening of seed as in the case of single flowers, which in many species are found to blossom less abundantly every second or third year. Botanists and Horticulturists differ very much in their estimate of double flowers, for whilst the former regard them as "monstrosities" or deviations from their original type, the latter look upon them as ornamental and desirable for cultivation. Whilst, in Europe, the peach, the cherry, and the hawthorn have long been known for the abundance of double flowers which they frequently yield, few double flowers have as yet been found amongst Australian plants, especially in a wild state. *Rubus rosifolius* (Sm. Ic. Pl., t. 60) a species widely spread over the warmer regions of Africa and Asia, is common to Queensland, N. S. Wales, and Victoria, and has long been known for its double or semi-double flowers; but perhaps of all orders in Australia, no one has such a tendency to produce them as the Epacrids. *Epacris purpurascens* (R. Br.) was one of the first found in that state, having been noticed many years since on Elizabeth Farm near Parramatta, and subsequently by Mr. Statham at the North Rocks. *E. microphylla* (R. Br.) was found double at the North Shore and Manly Beach; and Mr. C. French has collected in Victoria double flowers of *E. impressa* (Latreille), *Sprengelia incarnata* (Sm.) and *Astroloma humifusum* (R. Br.) It seems that the Epacrids have attractions for bees and other insects, and hence the probability that such flowers are peculiarly liable to suffer from hybridization, and that the stamens being deprived of their pollen are left to develop themselves into petals. Next to the Epacrids, some of the Ranunculaceæ seem most subject to deviate from their normal form and to afford instances of multiplicate and full flowers, but the causes remain yet to be investigated, for such flowers have been found in a wild state on both sides of the Dividing Range. If, as some horticulturists affirm, a moderate supply of moisture, a superabundance of decomposing organic matter, and the greatest possible exposure to sun-light are calculated to promote an extraordinary development of the floral envelopes, it may be conceived that certain species of *Ranunculus*, even in a state of nature, are liable to such contingencies. The species seen most frequently with double flowers is *Ranunculus lappaceus* (Sm.), and very lately Mr. F. Burnell collected in the neighbourhood of Urana some specimens of the small variety *pimpinellifolius* (Benth.), but which some botanists regard as distinct. This elegant little plant is only a few inches in height, and is characterised by spreading hairs, and scapes with a solitary bract. It is very probable that other species of *Ranunculus* may yet be found double, for *R. aconitifolius* (Willd.), *R. illyricus* (Willd.), *R. asiaticus* (Willd.), *R. repens* (Willd.), *R. acris* (Willd.) and *R. palustris* (Dec.)—some of which are nearly allied to Australian species—are well known in Europe for their full flowers, whilst one of them is subject to so many varieties that it has obtained the name of the "florists flower." The genus *Eriostemon*, which is one of the most admired of the Rutaceæ, may also reward the horticulturist with showy flowers under cultivation, for Baron F. von Mueller has already recorded *E. obovalis* (A. Cunn.) which is common to N. S. Wales, Victoria, and Tasmania, as being a very beautiful plant when seen with double flowers in its native wilds. The flowers of *Boronia pinnata* (Sm.) are liable to variation in size and colour, and appear according to Mr. Beatham to be sexually dimorphous; and therefore it seems probable that they may yet be found with the filaments in a transition state. The Rev. L. P. Atkin, M.A., reports that the native Convolvulus (*C. erubescens* (Sims.) has occasionally double flowers, and the writer of these remarks has found *Wahlenbergia gracilis* (A. Dc.) in a similar condition, which is still more remarkable, as the species so soon loses its stamens after flowering. But here again analogy leads to the supposition that such might be the case, especially when species are under cultivation, as the allied genus *Campanula* has several varieties with double flowers. In considering this subject it is evident that much remains to be learned as to the causes of the phenomenon itself, for though it is usually said that it arises from "hybridization aided by cultivation," it is evident from the examples quoted, that in Australia native plants sometimes become double without any cultivation; whilst again it is a fact that some genera are more susceptible of such eccentricity than others. It would be interesting to ascertain how far the introduction of foreign bees into Australia may have contributed to produce double flowers, for, as far as I am aware, none of the early Botanists have made any allusion to them, Sir W. Macarthur having been the first to notice the double *Epacris purpurascens*, and Baron F. von Mueller the first to record the fact respecting that and another species of the same genus (Frag. Phyt. Aust., Vol. VIII., p. 56). Bees are well known to exercise a wonderful influence on cultivated plants, and it is probably due to their carrying the pollen of one kind of flower to another, that, in certain cucurbitaceous species, some of the favourite varieties of former days have died out. Some of the monstrosities and strange appearances in flowers are in point of fact diseases occasioned by the ravages of insects; and *fasciated* branches which result from an abnormal development of the leaf buds, arise from accident or some unknown cause. Amongst cultivated plants *Xylophylla longifolia* (Linn.) and *Celosia cristata* (Willd.) afford instances of this strange growth, and amongst the wild flowers in the neighbourhood of

Sydney *Goodenia heterophylla* (Sm.) has been noticed in the same *fasciated* state. It is clear, therefore, that deviations from their typical character in flowers are not always due to cultivation, and that, in all probability, insects play an important part in the matter. The subject is one of interest to the Florist, and I may add to the Entomologist, for, as the late Mr. W. S. Macleay used to say "the affinities of plants may sometimes be traced by the presence of particular insects"; whilst it may fairly be assumed that the development of double flowers, as the result of hybridization and some other cause, points in a similar direction, viz., the agency of insects. My object in offering these remarks is to direct the attention of collectors to the abnormal growth in flowers, as they are sometimes seen in their native state. Persons engaged in collecting search only for perfect specimens and pass over any that deviate much from their types. These deviations, however, are not devoid of interest, and a greater knowledge of them may lead to a better understanding of the anomalies to which I have referred.

OCCASIONAL NOTES ON PLANTS INDIGENOUS IN THE IMMEDIATE NEIGHBOURHOOD OF SYDNEY.

No. 9.

By E. Haviland, F.L.S.

The plant forming the subject of this paper is *Lyonsia reticulata.* It belongs to the order *Apocyneæ.* The order is not very largely represented in Australia; affording but fourteen genera in all the Australian Colonies; and the genus *Lyonsia* but ten species; five of which are found in N. S. Wales. Two of these, *L. reticulata* and *L. lilacina,* in the County of Cumberland. *Lyonsia reticulata* appears to me to be somewhat rare, or at all events not plentiful. Of course the experience of other botanists may be different to my own. I have however, for the last two years, made a very diligent search for it, not only within six or seven miles of Sydney, but also in the country about Parramatta. Yet I have found but one plant, and that within a mile of Sydney. Fortunately I have been able to obtain a good supply of flowers for study from that plant. Dr. Woolls has since kindly informed me of one or two other localities where it may be found. If I am correct in my supposition that the plant is comparatively rare, it confirms my previous experience, and what I suppose is the experience of others, that as a rule, self-fertilised plants are so. Darwin points to this probability, both in his "Fertilization of Orchids," and his "Effects of Cross-fertilisation in the Vegetable Kingdom." In the first mentioned work he says, "Whether any species which is now never cross-fertilised, will be able to resist the evil effects of long continued self-fertilisation, so as to survive for as long an average period as the other species of the same genera which are habitually cross-fertilised, cannot of course be told." *Lyonsia reticulata* is a strong climber, and appears, where it is found, to attach itself to almost any forest tree; ascending to a height of forty-feet or more; and although the single plant that I have found near Sydney has attached itself to a comparatively low shrub, *Lambertia formosa*, it can be seen by its many convolutions that it is of great length. It bears small white flowers in panicles. The calyx monosepalous, its five lobes densely pubescent, the tube thick, and adnate by its lower portion with the ovary. Corolla monopetalous, its lobes somewhat longer than the tube, very much reflexed and densely pubescent. Stamens five, attached to the tube of the corolla. Anthers sagittate. Disk of five very distinct lobes or teeth. Ovary two-celled, divided by a thin septum, upon each side of which a peltate placenta bears the ovules.

The flower is in all respects a very curious and interesting one. The style and stigma, when freed from the closely lying anthers, have the appearance of having been turned in a lathe, or moulded in an ornamental manner. The stamens starting from the corolla tube, cross at once to the base of the style, then forming a ring round it, ascend, till the five large anthers lie closely together on the inclined surface of the stigma. The anthers are very long, being produced both above and below the pollen cells; and lying so closely round and upon the stigma, form a compact conical roof, with the base or eaves spreading out below so far from the stigma, as to quite protect it and the pollen from rain and dew. In fact, they adhere so closely to it, that it is a very difficult matter to separate them without tearing them. Botanically described, the anthers form an exserted cone; but I think I may convey a better idea of their appearance, by saying that they are like a half-opened umbrella, the style forming the handle, and the filaments and anthers the ribs and covering.

I have examined a great many flowers of this plant, in different stages as regards maturity; but have not met with an instance in which the anthers had separated, so as to expose the stigma, until after fertilisation had been effected. The pollen cells are of course inside the cone, and rest on the surface of the stigma. In every instance, in fully opened flowers, I have found the stigma mature and viscid and covered with pollen from its own anthers, the pollen however not being in great abundance. As this careful protection of the pollen and stigma exists until the flower has withered, I can only arrive at the conclusion that the plant is closely self-fertilised. While however I say this, I wish to repeat, that I have only had the opportunity of examining the flowers of a single plant. There is therefore just a possibility of plants existing which at some stage or other open their flowers and thus expose them to cross-fertilisation. Bentham however mentions the exserted cone of anthers as common to the whole genus.

It is impossible to examine the flowers of different plants, without being struck with the difference in their various pollens. In some cases the grains are powdery, loose and dry, and liable, one would think, to absorb moisture readily. In others waxy and more likely to repel it. I am strongly impressed with the idea, that in cases where the anthers and pollen are so carefully shielded, as in *Lyonsia*, there is another purpose to be served than the self-fertilisation of the plant. There are so many plants known to be cross-fertilised, and yet which have their anthers very carefully shielded; that the conviction is forced upon one, that the primary intention is to preserve the pollen from injury by rain or dew, in cases where it is absorbent and likely to be injured. In the case before us, *Lyonsia reticulata*, as I have already said, the backs of the anthers form so complete and compact a roof to the pollen-cells, that it would seem impossible even for a heavy shower to injure the pollen. In the genus *Cryptandra*, and especially in *C. amara*, the very small petals are hood-shaped, completely covering the anthers, until after the pollen is ripe; while it is quite possible for small insects to obtain access to it from below. There are too, hundreds of cases in which at night, when dew is likely to fall, flowers not only close, but droop; thus inverting the corolla, and making a roof of it to protect the anthers and pollen.

Acting on the supposition that the intention is to protect the pollen of those plants which would be injured by moisture; I selected that of three plants, *Lyonsia reticulata*, *Cryptandra amara* and *Correa speciosa*, in order to notice the comparative effect of moisture on their pollen. In the first two the anthers and pollen are protected, in the last they are fully exposed. I placed each kind of pollen in a watch-glass, in a dry place, till I supposed that as nearly as possible they were equally free from moisture; and then sprinkled them lightly upon the surfaces of three basins of water. That of *Lyonsia* became saturated and sank level with the water in a few minutes. That of *Cryptandra* in two hours. That of *Correa* remained floating upon the surface till the following day as though a film of air intervened between it and the water. The effect upon pollen, becoming saturated so readily as that of *Lyonsia*, would no doubt, especially under a warm sun, be to cause it to swell and burst in an irregular manner, in place of emitting pollen-tubes in the usual way; and this would destroy its fertilising power, for it is essential to the conveyance of the particles of fovillæ to the ovule, that the pollen grains be kept intact; so that it shall escape by means of the pollen-tubes only. In an experiment with fresh pollen taken from the same three plants, the result was the same, with the exception, that the time required for the saturation of the pollen of *Lyonsia* and *Cryptandra* was longer, but still in the same order as in the previous trial.

I must say, that as these experiments were made under some difficulty, and in rather a rough way, I do not consider them conclusive, I merely mention them as a suggestion to any one who may be inclined to carry them out in a more perfect way. It is however, my intention during the present summer to make many, more carefully, in the same direction.

NOTES ON THE DISTRIBUTION OF SOME AUSTRALIAN SHARKS AND RAYS, WITH A DESCRIPTION OF *RHINOBATUS BOUGAINVILLEI*, Müll. and Henle.

BY J. DOUGLAS-OGILBY,

SENIOR ASSISTANT ZOOLOGIST, AUSTRALIAN MUSEUM.

Having had occasion lately to overlook the collection of Sharks and Rays in the Australian Museum, I have thought that the following notes may prove of interest to ichthyologists, especially to those who have made a study of our palæichthyan forms. It will be seen, that in two instances, [those of *Scyllium maculatum* and *Rhinobatus granulatus*] I differ in my identification from those who have preceded me in this branch, and from the examination of numerous specimens, both in the Australian Museum and in that of the Hon. Wm. Macleay, I am convinced that neither of these species occur so far south as the New South Wales coast, where their place is taken by my recently described *Scyllium anale*, and by Müller and Henle's *Rhinobatus bougainvillei*, of which latter the habitat was previously unknown. I have also the pleasure in this paper of adding two new genera to the Australian fauna, viz., *Rhynchobatus djeddensis*, Forsk., which appears to be not uncommon, but has hitherto been mixed up with *Rhinobatus*; and *Pteroplatea* of which I came across a fine specimen caught near Cape Hawke, by Mr. J. Brown, and which is as yet undescribed. The addition of *Tæniura lymma* is also worthy of notice, though its previous discovery, on the south coast of New Guinea rendered its Australian record a mere matter of time; our specimen is from Cape York, and was collected by Mr. Walter Powell.

Carcharias crenidens. Klunz.

Some months ago I received from Mr. Henry Smithurst a small specimen of this shark which had been taken by hook at the Burnett River Heads; it is barely 12 inches long, yet shows no sign of the umbilical sac, and I conclude therefore that this species never attains a large size. I doubt the possibility of its specific separation from *C. acutus*, Rüpp., with which I had previously identified the small example in question.

Scyllium anale. Ogilby.

This species seems to be common in the neighbourhood of Port Jackson, but has been confounded with *S. maculatum*, Bl., from which it may at once be distinguished by the separation of the nasal valves. I have examined about a score of examples up to this time, but have not found a single specimen of Bloch's species, which must, I think, be excluded from the New South Wales list.

Chiloscyllium ocellatum, (Gmel).

The Australian Museum possesses a specimen of this fish caught in Port Jackson; it must, therefore, be included in future in the Fauna of this colony.

Rhinobatus bougainvillei. M. & H.

Preoral space $1\frac{7}{8}$ in the distance, between the tip of the snout and the vent; snout moderately produced; interorbital space concave, contained five times in the length of snout. Anterior nasal valve continued inwards by a short fold. Rostral ridges narrow, closely approximating in their anterior two-thirds. Mouth arched; teeth small, in about 90/80 rows; lower jaw with a central depression, on each side of which the teeth are much longer than elsewhere. A row of short depressed spines along the median line of the back, continued between the dorsals; a few short blunt spines on the shoulders, and at the upper anterior and posterior angles of the orbits, and a pair on the tip of the snout above. Skin of the lower surface of the rostrum with minute spines pointing backwards; a similar patch on the anterior angles of the pectorals above and below; remainder of the cuticle smooth.

Colors. Yellowish-brown above; dirty-white below.

This is the common *Rhinobatus* of the New South Wales coast, and is found at least as far north as Cape York, where its range overlaps that of *R. granulatus*, as is proved by a specimen of the latter being contained in the same bottle with several of the former in the Macleay Museum, and all labelled from the above-mentioned locality.

RHYNCHOBATUS DJEDDENSIS. (Forsk).

This fine species seems to be moderately common in the neighbourhood of Port Jackson, but though differing so plainly from *Rhinobatus*, has nevertheless been somehow confounded with the common shovel-nosed Ray, described above. The Australian Museum possesses a stuffed specimen from the harbour, which measures fully seven feet long.

TÆNIURA LYMMA. (Forsk).

As mentioned previously there is in the Museum an authenticated example from Cape York.

PTEROPLATEA AUSTRALIS.

Thanks to Mr. J. Brown, of Cape Hawke, I am enabled to include in this paper a record of this fine new species, which will be described next meeting by Mr. Ramsay and myself. We propose to name it *Pteroplatea australis.*

AËTOBATIS NARINARI. (Euph).

Must in future be included in the New South Wales fauna, two specimens having been sent to the Museum from Cape Hawke along with the preceding species.

CONTRIBUTIONS TOWARDS A KNOWLEDGE OF THE COLEOPTERA OF AUSTRALIA.

By A. Sidney Olliff,

Assistant Zoologist, Australian Museum.

No. I.—New Species of Carabidæ.

Lacordairia terrena, sp. n.

Black, shining, somewhat depressed; prothorax impunctate, slightly constricted behind, with a deeply impressed median line, the margins reflexed; elytra moderately strongly striate, the interstices rather narrow, flat and impunctate.

Head narrow, impunctate. Antennæ moderately long, the first three joints pitchy, the following ones dark reddish testaceous, the basal joint rather long, the second much shorter, the third somewhat longer, the following joints of about equal length, covered with fine yellow pubescence. Prothorax slightly transverse, the anterior angles rounded, the basal foveæ well marked. Elytra moderately broad, slightly convex, with narrow reflexed margins, a minute fovea on the second stria, just before the middle. Underside black, with a greenish tinge, shining, impunctate. Legs black, the trochanters, tips of the tibiæ and tarsi reddish testaceous. Length, 5 mm.

Mount Kosciusko, New South Wales (5700 feet).

A single specimen, which I conclude from its broad anterior tarsi to be a male, was obtained by Mr. Edward Meyrick in January last, near the summit of Mount Kosciusko. The species may at once be known by its small size, robust form; by its comparatively narrow prothorax being a little constricted behind; by its closely and distinctly striated elytra; and by the colour of its antennæ and legs.

I am by no means satisfied with the position assigned by Count de Castelnau to his genus *Lacordairia*. It appears to me that notwithstanding the great development of the palpi its affinities are more with the later tribes of the Geodephaga, such as the Anchomeninæ, than with the Pamboridæ from which it is widely separated by having the intermediate coxal cavities enclosed by the sterna and the epimeron not reaching the coxa. The head is furnished with two supra-orbital punctures. I am not able to come to any definite conclusion as to the position of the genus as I have no specimens available for dissection. I hope, however, to enter more fully into the subject hereafter.

XANTHOPHÆA PALLIDA, sp. n.

Elongate, pale testaceous, shining; head rather long, considerably narrowed behind the eyes; prothorax moderately strongly constricted behind; elytra not very strongly punctate-striate.

Head impunctate; eyes black, very prominent. Antennæ moderately long, the basal joint thickened, the second very short, the third about as long as the first, the following joints pubescent and of nearly equal lengths. Prothorax very slightly longer than broad, narrowed and moderately constricted behind, with narrow reflexed lateral margins; the anterior angles obtuse; the median line distinct. Elytra about twice as long as the head and prothorax together, narrower in front than behind, moderately strongly and closely punctate-striate, the interstices rather broad, slightly raised, and sparingly and not very distinctly punctured; humeral angles not prominent. Underside and legs coloured as above; tips of the mandibles and claws pitchy. Length, 11 mm.; greatest width, 4½ mm.

King George's Sound, West Australia; Bateman's Bay, New South Wales. Under bark.

This fine *Xanthophæa* will readily be recognised by its uniform testaceous colour, smooth surface and narrowly margined prothorax.

GENUS PLAGIOTELUM.

Solier in Gay's Hist. de Chile, Zool. IV., p. 132 (1849).

The species which I here refer to this genus, hitherto only known from Chili and Port Famine, near the Straits of Magellan, is interesting as being a new and striking example of an Australian form, finding its nearest ally in a genus from the west coast of South America.

PLAGIOTELUM OPALESCENS, n. sp.

Testaceous, shining, with bright green reflections; head and prothorax bright metallic green, the latter with the sides only slightly narrowed behind; elytra iridescent, moderately strongly striate, the apex dark green.

Head considerably longer than broad, narrowed behind, impunctate, the antennal impressions distinct; epistoma truncated in front. Antennæ reddish testaceous, the basal joint moderately long, the second very short, the third longer than the following joints which are covered with fine pubescence. Prothorax a little broader than long, slightly narrowed behind, finely aciculate near the sides; anterior angles very slightly produced; the lateral margins rather strongly reflexed; the median line not very distinct. Elytra moderately convex, about twice as long as the head and prothorax together, a little narrower in front than behind, rather strongly striate, the interstices moderately broad, slightly raised and impunctate; humeral angles rather prominent; the lateral margins reflexed. Underside bright metallic green, with bluish reflections; the sides of the head and sterna extremely finely aciculate. Legs pale reddish testaceous, apical halves of the femora and the tips of the tibiæ dusky. Length, 9 mm.; greatest width, 3½ mm.

Mount Wellington, Tasmania (3000 feet).

Differs from *Plagiotelum irinum*, Solier (l. c. Atlas, pl. 1, fig. 3) in colour and marking, in having the sides of the prothorax straighter and less narrowed behind and the elytral striæ rather more distinct. A single specimen of this pretty species was obtained by Mr. Masters from beneath the loosened bark of *Eucalyptus.*

CATASCOPUS CHALYDICUS, sp. n.

Elongate, metallic green, with steel-blue reflexions; head and prothorax tinged with coppery-green; elytra strongly punctate-striate, the fifth interstice narrow, the seventh costiform.

Head rather broad, strongly aciculate longitudinally on each side at the anterior margin, strongly and sparingly punctured on the basal half; clypeus coppery, finely punctured. Prothorax considerably broader than long, strongly narrowed and constricted behind, finely aciculate transversely, a few irregular punctures in front; median line moderately strong, impressed just behind the anterior margin and at the base; anterior angles slightly produced; the lateral margins narrowly reflexed. Elytra rather broad, about one and a half times as long as the head and prothorax together, strongly punctate-striate, the punctures stronger towards the sides, the interstices, except the fifth and seventh, rather broad and very slightly convex; the external apical angle acute. Underside and legs dark coppery green. Length, 15 mm.; greatest width, 5½ mm.

Richmond River, New South Wales.

More nearly allied to *Catascopus Chaudoiri* than to any other Australian species, but readily distinguished by its brighter colour, more robust form and strongly punctured elytra.

No. II.—On a New Species of Rhysodidæ.

The following species from the collection of the Macleay Museum represents a family hitherto unobserved in Australia.

Rhysodes lignarius, sp. n.

Elongate pitchy-black, shining; head rather broad, impunctate, with a oblique groove on each side extending from the base of the antennæ to the middle of the posterior margin; the head considerably swollen behind these grooves; prothorax narrowed behind, with a strongly impressed median groove, and an equally strong slightly out-curved groove on each side extending from the anterior margin to just before the base; elytra rather strongly punctate-striate.

Head with a fine reflexed anterior margin; eyes moderately prominent. Antennæ finely pubescent. Prothorax not much longer than broad, strongly narrowed behind, impunctate, the dorsal grooves foveolate at the base; the sides strongly rounded; the posterior angles somewhat acute. Elytra at the base a little broader than the prothorax; humeral angles moderately prominent; each elytron with seven rather strongly punctured striæ, the interstices moderately broad, slightly convex and impunctate; the apex distinctly rugose-punctate, not shining. Underside colòured as above; the prosternum irregularly rugose-punctate; meso- and metasternum very strongly punctured at the sides, a longitudinal impression in the middle containing an irregular row of punctures; abdominal segments strongly punctured. Legs pitchy; anterior tibiæ with a short spine near the apex. Length, 7½ mm.

Yass, New South Wales (G. Salting). In rotten wood.

Differs from all the species known to me in its broad form, and in having its comparatively short prothorax decidedly narrowed behind. Judging by descriptions it may be separated from the New Zealand species by having each elytron furnished with seven striæ.

A NEW GENUS OF THE SUB-FAMILY LAMPRIMIDES OF LACORDAIRE.

BY WILLIAM MACLEAY, F.L.S., &c.

In a Paper read before this Society at the April meeting of this year, entitled "Revision of the Genus *Lamprima* of Latreille," I described under the name of *Lamprima Muelleri* a very beautiful and distinct female insect of the group, mentioning at the time that I thought it likely that the discovery of the male would probably prove it to be generically distinct from *Lamprima*. My surmise turned out to be correct. Mr. C. French of the Botanical Museum of Melbourne, from whom I received the specimen originally described, has now sent me for inspection a male specimen of what I feel convinced is the same species. It is I think the most beautiful insect I have ever seen, not surpassed in brilliancy of metallic lustre and size by the most gorgeous of the Buprestidæ. Though closely allied to *Lamprima*, it cannot be placed with it, if Dr. Gestro's genus *Neolamprima* be admitted as a genus, for that is undoubtedly much nearer the typical *Lamprima*, than the present insect. Dr. Gestro gives as the only distinctive character of his genus *Neolamprima* the long and many-toothed mandibles. One of these characters only applies to the present insect for which I propose the name of *Phalacrognathus* from its glabrous mandibles.

This genus may be briefly characterised as follows, in the absence of other species, for I have often found the inconvenience of too narrowly defining the boundaries of genera in a country where fresh species are constantly turning up.

"Mandibles very long, porrect, curving upwards, smooth, glabrous, and unarmed on the lower and inner edges. Basal joint of antennæ scarcely clavate, and as long as the other joints combined. Fore tibiæ of the male without the foliate spur.

PHALACROGNATHUS MUELLERI. Macleay.

Lamprima Muelleri. Proc. Linn. Soc., N. S. Wales, Vol. X., p. 135, Female.

Male. Head short, angular before the eyes, emarginate in front, quite smooth, and of a brilliant dark metallic green. The mandibles which are of a black colour, exceed in length the head and thorax conjoined, they have a few minute teeth at the inner base close to the mouth, and a strong horn pointing upwards close to the head, from thence they extend forwards, curving upwards in two long smooth parallel shafts, grooved without and fluted within and terminate in two broad flattened diverging points; there is no vestige of hair or pile.

The thorax is much wider than long, moderately convex and of a dull brassy hue; the anterior portion of the sides have a broad nitid margin, the posterior is crenulated as in the female, the base is narrowly margined and slightly sinuate, the median line is almost obsolete. The elytra differ from those of the female, in being entirely without punctures, in greater brilliancy of metallic splendour, in having the lateral margin crenulated for some distance behind the shoulders, and more distinctly emarginate and narrowed towards the apex. The anterior tibiæ are strongly toothed externally along their whole length and the extension of the anterior femur on each side of the knee-joint is very conspicuous.

Long (mand. incl.) 24 lines.

This description must of course be read with my previous one of the female, as it is only the sexual distinctions which I have now given.

I have been unable, I regret to say, to examine the trophi so closely as I could have wished, as it is impossible even in the case of insects of such large size, to investigate the parts of the mouth without dissection, and that of course is out of the question with unique specimens; but I believe they vary little from those of *Lamprima.*

Mr. French has given me no nearer approximation to the habitat of this magnificent insect than "North Australia."

ADDENDUM TO THE MONOGRAPH OF AUSTRALIAN SPONGES.

By R. von Lendenfeld, Ph.D.

In the Annals and Magazine of Natural History, Ser. 5, Vol. 7, No. 41, May 1881, p. 373-374 H. J. Carter describes a Sponge from Bass' Straits, which should be placed in the Myxospongiæ, and which has been omitted by me.

The specimens at the disposal of Carter were dry, and so as no reference is made to the structure of the sponge it will remain doubtful to which genus it should be referred, Oscarella or Halisarca (in my sense.) I place it provisionally in the former. With this name it should be added to my previously mentioned Australian species of Oscarellidæ.

OSCARELLA BASSANGUSTIORUM. Von Lendenfeld.

Halisarca Bassangustiorum. Carter (l.c.)

I will give Carter's own description in full as the species is a very doubtful one. (l.c.)

Among the "dredgings" from Bass' Straits are two more or less thin, light, corrugated, even-margined. sub-circular specimens, about an inch in diameter each, one of which is dark purple, almost black, and the other brown in colour. Both are charged with globular bodies like cells, about 3½-6,000ths inch in diameter; but while these are indistinct in one of them, they are well-defined, spheroidal and capsular in the other. How far these specimens may have been brought to this state by exposure in the waves and on a hot dry beach I cannot say; but to expect Halisarca after such exposure to present any of its original features is out of the question. All therefore, that I can add is that the "brown" specimen in a smaller state appears again attached to Dictyocylindrus reticulata (to be described hereafter) from the same locality and charged with the same kind of spherical capsular bodies (? ova) where it so far manifests all the appearance of Halisarca, that I can hardly doubt that both are dried specimens of one and the same, for which I propose the name above given. Neither becomes gelatinous when soaked in water, although when dry the brown specimen presents here and there the appearance of dried glue, which the dark specimen does not. I admit that this description is not satisfactory; but under the circumstances it cannot be otherwise; at the same time it is desirable that it should be recorded to induce future observation.

Loc., Bass' Straits.

Teichonella prolifera. Carter.

In Annals and Magazine of Natural History, Ser. 5, Vol, 15, Nr. 89, p. 119, foot note. Carter gives a new locality for this sponge, namely, Port Phillip.

Teichonella labyrinthica. Carter.

In Annals and Magazine of Natural History, Ser. 5, Vol. 15, Nr. 86, p. 119-120. Carter describes the ciliated chambers of this species, and gives a new locality for it, namely, Port Phillip.

The description of the canal system is very remarkable. The chambers are cylindrical as in the Syconidæ, and there is one large terminal inhalent pore, and one large exhalent pore on the other end, likewise terminal. In no other sponge has it hitherto been observed that the inhalent pore or pores was as large or anything approaching the size of the exhalent pore, the Chamber Osculum. This statement therefore must be received with caution. At the same time Carter states that there are numerous small pores in the wall of the cylindrical chamber. These are homologous to the ordinary inhalent pores in the ciliated chambers of other sponges.

I consider it as highly probable that these are actually the inhalents, that inhalent canals exist between the cylindrical chambers, and that there is no large vent at one end, or if there is it is likewise an exhalent pore.

Leucandra cataphracta. Haeckel.

An exceptionally slender specimen, measuring only 2 mm. in diameter, has been obtained from Port Stephens (Australian Museum), and this place has to be recorded as new locality for the species.

III. ADDENDUM TO THE AUSTRALIAN HYDROMEDUSÆ.

By R. von Lendenfeld, Ph.D.

In the Proceedings of the Linnean Society of N. S. Wales for 1884, Vol. IX., Pt. 3, p. 534 (1), a list of new localities of five Australian Hydromedusæ is given. One of these is a new species. The list was written by Kirchenpauer and communicated by F. Bar. Mueller.

Dr. Kirchenpauer has recently published an essay on Sertularidæ "Nordische Gattungen und Arten von Sertulariden von Dr. Kirchenpauer in Hamburg" in the Abhandlungen des Naturwissenschaftlichen Vereines in Hamburg, Band VIII., Abth. I., 1884 (2).

In this essay, several new Australian species have been described and I shall give a list with references to all those below.

Since the "Australian Hydromedusæ" have been published in these Proceedings I have made a few slight alterations and several additions in Addendum Nos. I. and II., this is the third Addendum of this kind. The classification used here is the amended one, published recently in the Zeitschrift für wissenschaftliche Zoologie, Band XLI., Seite 616 ff., (3) by myself.

I. SUB-ORDO. HYDROPOLYPINÆ

5. FAMILIA. BLASTOPOLYPINÆ.

IV. SUB-FAMILIA. SERTULARINÆ.

9. GENUS. SERTULARELLA.

20. SPECIES. SERTULARELLA POLYZONIAS. Gray (1) 543.

Recorded as Sertularella simplex Hutton from Mount Dromedary, East Coast of Australia, by Kirchenpauer.

26. SPECIES. SERTULARELLA JOHNSTONI. Allman (1) 534.

Recorded as Sertularella Johnstoni Gray from the Richmond River Heads, East Coast of Australia by Kirchenpauer.

29A. SPECIES. SERTULARELLA MUELLERI. Kirchenpauer (2) 49.

A new tricuspidate species from the Chatham Islands to be added to the Australian species.

29B. SPECIES. SERTULARELLA PURPUREA. Kirchenpauer (2) 49.

A new tricuspidate species from the Chatham Islands to be added to the Australian species.

29C. SPECIES. SERTULARELLA SUBDICHOTOMA. Kirchenpauer (2) 46.

A new tricuspidate species from Bass' Straits, which also occurs in the Straits of Magellan, to be added to the Australian species.

29D. SPECIES. SERTULARELLA INFRACTA. Kirchenpauer (2) 46.

A new tricuspidate species from Bass' Straits, Hobson's Bay and Richmond River Heads, to be added to the Australian species.

29E. SPECIES. SERTULARELLA RETICULATA. Kirchenpauer (2) 40.

A new quadricuspidate species from Bass' Straits to be added to the Australian species.

13. GENUS. THUIARIA.

42A. SPECIES. THUIARIA CARTILAGINEA. Kirchenpauer (1) 534, (2) 25.

A new species from the East Coast of Australia near Mount Dromedary to be added to the Australian species.

42B. SPECIES. THUIARIA AMBIGUA. Kirchenpauer (2) 25.

A new species from the East Coast of Australia, Sealer's Cove, to be added to the Australian species.

42C. THUIARIA BIDENS. Allman (*), (2) 24.

This species has been described by Kirchenpauer (l.c.) from New Zealand and has accordingly to be added to the Australian species.

42D. THUIARIA SUBARTICULATA. Coughtry. (**)

A species from New Zealand to be added to the Australian species, (2) 24.

42E. SPECIES. THUIARIA LICHENASTRUM. Kirchenpauer (2) 22, SERTULARIA LICHENASTRUM. Pallas.

This species from the Indian and Atlantic Oceans has also been found in Australia and must accordingly be added to the Australian species.

42F. SPECIES. THUIARIA CERASTIUM. Allman. (***)

This New Zealand species is to be added to the Australian Hydroids.

7. FAMILIA. PLUMULARIDÆ.

28. GENUS. AGLAOPHENIA.

116. SPECIES. AGLAOPHENIA RAMOSA. Bale.

A new locality is stated by Kirchenpauer (1) 534 for this species under the name of Aglaophenia ramosa, Busk; namely, Mount Dromedary, east coast of Australia.

(*) Journal of the Linnean Society of London, Vol. XII.

(**) Transactions of the New Zealand Institute, Vols. VII.-VIII.

(***) Journal of the Linnean Society of London, Vol. 12.

II. SUB-ORDO. HYDROMEDUSINÆ.

12. FAMILIA. CAMPANULINIDÆ.

II. SUB-FAMILIA. SERTULARINÆ.

61. GENUS. POLYSERIAS. Merejkowsky. (*)

Sertularinæ, the Hydranths, of which are disposed in more than two series along the stem. (Selaginopsis. Kirchenpauer (2) 7).

180. POLYSERIAS MIRABILIS. Merejkowsky.
POLYSERIAS HINCKSII. Merejkowsky.
DYPHOSIA MIRABILIS. Verill.
SELAGINOPSIS MIRABILIS. Kirchenpauer.

This widely distributed species has been obtained by Verill, from the coast of New England, and has accordingly to be added to the Australian species.

62. GENUS. SERTULARIA.

222. SPECIES. SERTULARIA ELONGATA. Lamouroux.

Kirchenpauer (1) 534 mentions this species under the name of Sertularia lycopodium, de Lamarck, as occurring at the Richmond River Heads and near Mount Dromedary.

224A. SPECIES. SERTULARIA MILLEFOLIUM. De Lamarck.

This species was obtained by Kirchenpauer (1) 534 from the East coast of Australia, near Mount Dromedary, and has accordingly to be added to the Australian species.

In all one Genus and 13 Species have been added to the previously described Australian ones.

I think it not unlikely that one or the other of Kirchenpauer's new species may be identical with some described recently by W. Bale in the "catalogue of the Australian Hydroid Zoophytes."

I think it, however, better to leave it to Dr. Kirchenpauer and Mr. Bale to find this out themselves, as they, being in possession of the types, are much better able to judge than anyone else.

The total number of Australian Genera is herewith increased to 74, and that of the species to 254.

(*) Annals and Magazine of Natural History. 1877, September.

A MONOGRAPH OF THE AUSTRALIAN SPONGES.

By R. von Lendenfeld, Ph.D.

Part VI.

THE GENUS EUSPONGIA.

II.—SUB-FAMILIA SPONGINÆ.

Spongidæ of a massive bulbous or irregularly digitate or thick lamellar shape. Vestibule spaces are developed in a few species only, and where they are present they are reciproc to those of the Auleninæ, inasmuch as only inhalent pores are found in their walls, whereas in the Auleninæ, either inhalent and exhalent pores, Oscula are found in them, or there is a tendency towards converting them into Oscula tubes, by the apertures of the exhalent canals becoming more numerous in the walls of these spaces than in other parts of the sponge surface. In those species of Sponginæ, which possess them at all, they are connected with the inhalent canal system only. Such vestibule spaces have been observed in Euspongia canaliculata and irregularis, and also in Hippospongia and some species of Cacospongia.

The skeleton is composed of "main" and "connecting" fibres. The main fibres are disposed in a radial direction and slightly branched in a pencillate manner. They are 2-12 times as thick as the connecting fibres and generally cored with foreign bodies sand-grains, &c. The connecting fibres are always free from foreign bodies with the exception of Euspongia silicata. They are mostly branched. The ramification is regular or irregular in as much as in some species all the connecting fibres are of uniform thickness and form a network with very regular meshes by continually anastomising with one another; or there are radial and tangental connecting fibres distinguished. In that case the tangental fibres are much thicker and extend from one main fibre to the other; the radial ones 2-8 times as the thin and vertical on the former, extend between the adjacent tangental connecting fibres. Both these kinds of ramification of the skeleton fibre are observed in Euspongia species and also in Hippospongia. The connecting fibres in Cacospongia species are not so much branched as in the other two genera so that the meshes of the network, which they form are larger.

Sand and other foreign bodies are often found in abundance in the surface. The sub-dermal cavities are not very highly developed. The pore-sieves in some species contain a great many small pores, in others again only one or two larger ones. In some, narrow canals lead from the pores into the large tangental canals, which form the sub-dermal cavity, whereas in others the pores open direct into them.

Internal canal system and the ciliated chambers do not possess any peculiarities. The chambers measure on an average 0·099—0·013 mm., in diameter.

Sensitive cells occur in various parts of the sponge.

In the family Spongidæ, Schulze (1) acknowledges six genera, namely Euspongia Bronn, Hippospongia Schulze, Phyllospongia Ehlers, Cacospongia Schmidt, Carteriospongia Hyatt and Stelospongia Schmidt. The genera Euspongia, Hippospongia and Cacospongia belong to our sub-family Sponginæ. The other three genera comprise sponges, which belong to the next sub-family namely the Chalinopsinæ.

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(1) *F. E. Schulze.* Ueber den Bau und die Entwickelung der Spongien, VII. te Mittheilung. Die Familie der Spongidæ. Zeitschrift für wissenschaftliche Zoologie. Band XXXII., Heft 1.

I have not found it necessary to establish any new genera in this sub-family so that it is constituted of the three genera mentioned above. These are all represented by Australian species, there are no genera known, which have no Australian representatives.

30. GENUS. EUSPONGIA. Bronn (1).

Sponginæ with continuous main fibres. Vestibule spaces are rarely developed and never cause the sponge to attain the appearance of much curved lamella frequently coalescing as in Hippospongia. The meshes of the connecting fibre network are so fine, that they cannot be distinguished with the naked eye. By this our-genus differs from Cacospongia. The thickness of the connecting fibres is also less than in the latter species. The average is 0·01 mm.

The diagnosis of the genus is similar to that given by F. E. Schulze. Although Bronn was the first to introduce the name, he meant something different with the word Euspongia than Schulze, according to Bronn, also Hippospongia species would have to be considered as belonging to the genus Euspongia.

A great many of the sponges described by various authors as species of the old genus Spongia belong to our genus Euspongia, as a reference to the synonyms will show. Also the genera Ditela O. Schmidt and Coscinoderma Carter belong to this genus.

Altogether 20 species of sponges can be considered as belonging to this genus. 8 of these are described for the first time in the following pages. 15 species of the 20 are Australian. One of these is cosmopolitan.

I divide the genus Euspongia into 7 sub-genera according to the differences in the mode of ramifying of the connecting fibres. The characteristics of these sub-genera are the following :—

Connecting fibres regularly branched of very varying diameter (Plate 36, fig. 3.)	1. *Irregularis*
Connecting fibres differentiated into thick tangental and very thin radial ones (Plate 36, fig. 1.)...	2. *Triplicis.*

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(1) *Bronn.* Die Classen und Ordnungen des Thierreiches. Erste Auflage.

The connecting fibres are differentiated into primary thick long and straight ones, and secundry very short and exceedingly slender ones (Plate 36, fig. 6.) .... 3. *Laxifibris.*

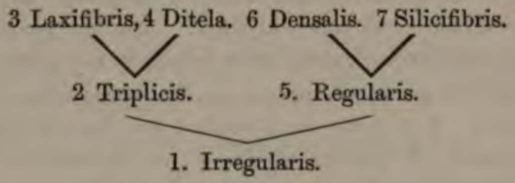
The connecting fibres form a particularly dense network of thick fibres, with narrow meshes, in the skin, in the interior they resemble Triplicis (Plate 36, fig. 5) .... 4. *Ditela.*

Connecting fibres regularly branched of uniform thickness (Plate 36, fig. 2.) .... 5. *Regularis.*

Connecting fibres thick, meshes of network very small (Plate 36, fig. 4.) .... 6. *Densalis.*

Main and also connecting fibres contain in their axes foreign siliceous spicules but no other foreign bodies (Plate 38, fig. 1.) .... 7. *Silicifibris.*

These sub-genera have been established by me more for the sake of convenience than to express real differences in the relationship of different species. If we were to adopt them as such however, we would have to consider their mutual relationship as follows:—



I. SUB-GENUS IRREGULARIS.

Euspongia species, the skeleton of which consists of main and connecting fibres. The latter form a regular and fine network. Never more than three fibres join at one point. If these three are of uniform thickness the angles between them are the same.

The distance between two adjacent joining points is also fairly uniform, so that the meshes are all of uniform size and similar in shape, were the fibres are of uniform thickness. But we find that the fibres are very irregular in this respect from the very finest, measuring only 0·001 to such, measuring 0·01 mm.; all gradations are formed, and the angles at the joining points of fibres of unequal thickness are not equal. The fibres are formed in this way, that the thinner one grows out from an already existing thick one. The latter is straight at first, so that then the angles at the sides of the newly formed thin fibre will be 90° each, and the third angle 180.°

As the young fibre grows in thickness it draws the other fibre out of its straight course, so that the angles on the sides of the young fibre increases, whereas the other one decreases. The three fibres issuing from one joining point lie nearly in a plain, so that the sum total of the three angles is nearly 360.° The distances between the joining points of thin fibres are smaller than those between the joining points of thicker ones, and in consequence of this the network becomes irregular. Poléjaeff (1) gives a figure of thicker and thinner connecting fibres in Luffaria. Our sponges have a very different skeleton, inasmuch as there are a great many fibres of intermediate thickness, and not a system of thick and a system of fine ones, as in that Luffaria.

68. SPECIES. EUSPONGIA IRREGULARIS. Nova species.

In this species I distinguish the following four varieties :—

I. Euspongia irregularis silicata.
II. Euspongia irregularis lutea.
III. Euspongia irregularis tenuis.
IV. Euspongia irregularis Jacksonia.

Shape and Size.

The shape of the different varieties and even of different individuals of one and the same variety, vary very much, so that no diagnosis of it can be given.

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(1) *N. Poléjaeff.* The Zoology of the Voyage of H.M.S. Challenger. Part XXXI. Report on the Keratosa, Plate IX., Fig. 5.

The specimens of *Euspongia irregularis silicata* are lobate or massive, but never digitate, sometimes bulbous and spherical. The lobes are slightly flattened and irregular, large and not numerous. This variety is small, the largest lobate specimen measures 120 x 90 mm. The lobes may attain a height of 20 mm., and a similar width, they measure about 8 mm. in thickness.

Occasionally no massive central part at all is developed, and then we meet with different forms. These are lobate, but already approach towards the digitate forms. They are, however, always compressed, so that the lobate character is retained, however much they may resemble digitate forms.

The specimens of *Euspongia irregularis lutea* are massive and irregular without any processes at all. The largest measure to 150 mm. in diameter.

The specimens of *Euspongia irregularis tenuis* possess a very irregular shape with rounded processes. The extensive vestibule spaces render this variety similar to Hippospongia. Some of the specimens of this variety attain a large size, measuring 200 mm. in the largest diameter, generally, however, they are much smaller.

The specimens of *Euspongia irregalaris Jacksonia* are decidedly digitate. These sponges have an irregular shape and attain a size 150 mm. in their greatest diameter. The digitate processes which grow out from the central irregular mass all tend upwards, they are found particularly well developed on the upper side of the sponge. Most of them are cylindrical and rounded at the top. Possessing a circular transverse section these are truly digitate. A few, however, also appear lobate and irregular. They attain a length of 30 mm. and are generally 8 mm. thick. Those which grow out from the side of the sponge are curved, so that their terminal parts are vertical.

RIGIDITY.

The skeletons are elastic and not very hard. Small specimens, measuring about 50 mm. across are compressed by the weight of 1 kilogramm, about 15 mm. on an average.

Some specimens of *Euspongia irregularis tenuis* are much softer, and one measuring 40 mm. was compressed 50%, that is 20 mm., by the same weight.

This sub-variety might be used for bathing purposes but seems to be rare. I have only seen one single specimen which came from Mauritius.

Euspongia irregularis Jacksonia is the hardest of all..

COLOUR.

Only the varieties *Euspongia irregularis silicata* and *Jacksonia* have been seen by me in the live state; their colour is light brownish yellow, but varies apparently according to the size or age of the sponges. The largest specimens are very dark in colour, while the small ones are of a light Melange.

In spirits the colour is fairly well preserved but becomes duller and lighter.

Beach-worn skeletons differ very much in colour. Those of *Euspongia irregularis silicata* are dark dirty greyish brown. Those of *Euspongia irregularis lutea* are of a remarkable orange-brown colour, similar to burnt "siena." The skeletons of *Euspongia irregularis tenuis* are very light in colour.

The very soft specimen from Mauritius referred to above is of a pretty light brown colour. Others are nearly white, or very light grey.

The skeleton of *Euspongia irregularis Jacksonia* is dark chestnut brown. It is, according to this possible, to distinguish the varieties of this species from one another by the colour of their beach-worn skeletons.

Surface.

The surface of *Euspongia irregularis* specimens of all varieties is the same. It is covered by small conuli, close to one another throughout. Such conuli are also observed in the surface of the vestibule cavities. They are not very regularly disposed, so that the fields between them become slightly irregular. They are on an average 2 mm. apart and 1 mm. high rounded at the top. Often two adjacent conuli coalesce whereby the irregularity in the configuration of the surface is much increased. Sometimes there are zones 3 mm. in breadth without conuli (*Euspongia irregularis Jacksonia*,) running up one side of the digitate processes in a longitudinal direction. These are homologous to the ones more minutely described further on of the species *Euspongia canaliculata ;* they are, however, not met with in the other varieties in so distinct a developement, although also in these indications of aconulose patches are observed.

The oscula are scattered over the outer surface of the sponge in an irregular manner. In those specimens which possess aconulous zones we always find the oscula in these zones. The oscula are are circular and measure from 1-4 mm, in diameter.

Slightly magnified the surface presents the appearance of a very regular network. The meshes of this network measure from 0·1-0·4 mm., in diameter and are always of uniform size throughout the surface.

In *Euspongia irregularis silicata* they are the largest—0·4 mm., and in the variety *Jacksonia* the smallest, measuring 0·1 mm., across. This network is formed by a system of raised lines on the surface, which are about as broad as the depressed meshes between them. In these raised lines an abundance of sand grains and other foreign bodies is generally met with. These give to the whole the appearance of a sand net. This sand net is very regular. Long siliceous spicules are found in it in great masses. These of course are foreign and only collected and not produced by the sponge.

The depressed portions of the surface between this network are the pore sieves. Thin unprotected membranes perforated by the inhalent pores. These pores are very remarkable and different from the inhalent pores, usually observed in horny sponges, in as much as they are very large and few in number. One or two in each field only. They measure 0·03 mm., on an average in diameter and are circular.

The canals leading down from them into the body of the sponge shall be described further on.

This net structure of the surface is developed in a similar manner in the fields between the conuli and on the aconulous portions, as also in the surface of the vestibule spaces.

It is absent only in the surface of the true canals of the sponges and consequently a very useful structure in determining which canals are true canals and which are vestibule spaces.

CANAL SYSTEM.

A. VESTIBULE SPACES.

As mentioned above, some of the varieties of this species possess very highly developed vestibule cavities, which however are, as pointed out above, by no means homologous to those described in my last paper on Auleninæ. As no oscula are met with in their surface they might be considered as portion of the inhalent system. But the transision forms which connect these vestibule varieties with irregular digitate forms without vestibules are of such a nature as to preclude their acceptance in this sense. Referring to the formation of these Auloplegma structures described in my paper mentioned above I would like to draw the attention of the thinking reader to the different result attained in the two sub-families Sponginæ and Auleninæ by the further developement of this interesting structure.

This can best be explained by the adjoined tabular description :—

(8a.) The apertures in the wall of the sack are closed, and the secundary Pseudogaster hereby becomes a true Oscular tube. At the same time the Pseudosculum is converted into a true Osculum. (*Dendrilla rosea, Cacospongia Exemplum terminus.*)

(7a.) This folding results in the formation of an irregular sack, not quite closed, however, with a Pseudosculum. Into this sack, which is a Pseudogaster, only the Oscula open. Whereas the inhalent pores are found in the outer surface only (*Aphrodite Nardorus.*)

(7b.) This folding results in the formation of an irregular system of wide Lacunæ, Pseudogaster, in the surface of which no Oscula, but inhalent Pores exclusively are met (with. (*Euspongia* and *Hippospongia.*)

(6.) This whole structure again folds itself and a secundary Pseudogaster is formed thereby, in the surface of which inhalent pores and Oscula are found (*Aulena, Halme* and *Halmopsis.*)

(5.) The chambers become regular in shape and the wall of the sack is folded so as to form an ordinary sponge. The Pseudogaster is converted into an Oscular tube; the Pseudosculum into a true Osculum (*Leuconidæ, Teichonidæ.*)

(4.) A Pseudogaster is formed by the Sponge attaining the shape of a closed sack, in the walls of which the irregular chambers lie. Small pores lead into the chambers from without. Their larger excretary pores, chamber Oscula open into the Pseudogaster (*Leucopsis.*)

(3.) The individuals coalesce to form an irregular mass imbedded in a Mesoderm. Inhalent and exhalent pores leading direct into the chambers are scattered irregularly over the surface. (*Auloplegma.*)

(2.) Sponges which consist of a colony of Olynthis, the individuals of which retain their individuality and Oscula. (*Soleniscus.*)

(1.) The whole sponge consists of one single irregular ciliated chamber, with inhalent pores in its simple wall, and a chamber Osculum, which at the same time is the Osculum of the sponge. (*Olynthus.*)

This tabular view of the developement of the canal system of course does not indicate that the species mentioned as examples are descended from one another. But it shows how the common gastread ancestor developes into the most highly differentiated sponges by a continued process of folding.

The table is the result of the study of the comparative anatomy of the canal system. Transition forms are met with throughout. Of particular interest are those described by me (1) of Cacospongia exemplum which lead from stage 5 to 8a in a peculiar manner and the peculiar structure of Aphrodite Nardorus, described by me in the same paper (2). Some statements regarding the developement of the canal system of Calcareous sponges will be found in Part III., of this Monograph (3).

Of particular interest also is Dendrilla rosea (4) in as much as the oscula tube of this species possesses under its wall, small sub-dermal cavities, similar to those under the outer skin, only smaller.

At the time I drew attention to this extraordinary structure, I do not doubt now, that these sub-dermal cavities are a rudimentary organ indicating that this oscular tube is being formed from an inverted portion of the outer skin. It represents one of the last transision forms between the stages 7a and 8a.

No further developement of the stage 7b has as yet been observed, but it may be assumed that some sponges with a very highly developed inhalent canal system, and particularly those which possess sensitive cells in the diaphrgms which pervade the inhalent canals, have obtained their inhalent canal system by a secundry plication of the ectodermal wall.

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(1) *R. v. Lendenfeld.* A Monograph of the Australian Sponges, Part V. The Auleninæ. Proceedings of the Linnean Society of New South Wales, Vol. X., part 3.

(2) *R. v. Lendenfeld.* L.c.

(3) *R. v. Lendenfeld.* A Monograph of the Australian Sponges, Part III. The Calcispongiæ. Proceedings of the Linnean Society of New South Wales, Vol. IX., p. 1083 ff.

(4) *R. v. Lendenfeld.* Ueber Cœlenteraten der Südsee, II. Mittheilung, Neue Aplysinidæ. Zeitschrift für wissenschaftliche Zoologie, Band XXXVIII., Seite 277.

So long however as no direct proof for this has been brought forward, it will be well to suppose that the inhalent canals have been produced before the sub-dermal cavities and the very constant pore-sieves on the surface; and that no secundry process of ramification, occurring after the sponges possessed pore-sieves, sub-dermal cavities, &c., has ever lead to the formation of true inhalent canals *below* the skin.

Numerous difficulties present themselves in connection with the formation of the inhalent canals by implication, and here in the sponges with complicated sub-dermal cavities particularly Marshall's hypothesis of an entodermal origin of these canals may come near the truth.

While this result of the study of the comparative anatomy of the canal system corroborates the theory established by F. E. Schulze (1) that the sponges are ontogenetically formed by a continued process of folding, to which I referred in my last paper on the Auleninæ (2); it shows at the same time that some of the oscular tubes, and very likely all which are very highly developed and large, are formed by an invagination of the outer skin and are accordingly clad with *ectodermal* cells. The limit between ectoderm and entoderm need therefore not necessarily be situated on the margin of the osculum.

Whilst in some Auleninæ, particularly Halme, the sand-armour is developed in the outer skin only, we find here, and also in Euspongia canaliculata no difference in the structure of the skin on the outer surface and in the vestibule spaces of the interior: the formation of these spaces in *Euspongia* and *Hippospongia* is a more recent acquirement.

The development of the vestibule is different in the different varieties of *Euspongia irregularis*. In *Euspongia irregularis silicata* the vestibules form anastomosing and very much curved canals with a circular or oval transverse section and an average width of 3 mm. These join to form a pseudogaster which opens by a slightly raised pseudosculum in some specimens. In others no true pseudosculum has been observed, but generally such are well defined. They are from three to ten in number. We will find them much higher developed and most remarkable in *Euspongia canaliculata*. *Euspongia irregularis lutea* possesses no vestibule space.

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(1) *F. E. Schulze.* Untersuchungen über den Bau und die Entwickelung der Spongien IX., Mittheilung, Die Plakiniden. Zeitschrift für wissenschaftliche Zoologie. Band XXXIV., Seite 438.

(2) *R. von Lendenfeld.* A Monopraph of the Australian Sponges, Part V., The Auleninæ. Proceedings of the Linnean Society of New South Wales. Vol. X., part 3.

In *Euspongia irregularis tenuis* on the other hand it is very highly developed, and formed of similar anastomosing canals as in the variety *silicata*. No pseudoscula have been observed in the specimens of this variety, as the vestibule canals open irregularly and indiscriminately over the whole surface.

Euspongia irregularis Jacksonia is similar, as far as the developement of the vestibule spaces is concerned, to the variety *tenuis*.

B. True Canals.

The canal system of all the varieties is the same. In fact if I found two similar sponges with any difference in their canal system I would consider them as two distinct species.

In each pore-sieve there are one or two large inhalent circular or oval pores measuring on an average 0·03 mm. in diameter. Of course their size greatly depends on circumstances. I have never observed them to be entirely closed, but I believe that the strong muscular cells which are disposed in rings around them, so as to form true sphincters, can contract them to a quarter of their width when dilated. The largest I have seen measured 0·05 mm., the smallest 0·012 mm. across.

From these pores narrow canals lead down in an oblique direction through the thick skin. These canals average a width of 0·04 mm., which measurement corresponds with the measurement of the dilated pores as seen from the surface very well. The skin is on an average 0·06 mm. thick and below it the sub-dermal cavities extend. These cavities are formed by tangentally extended canals of a circular transverse section, which form frequent anastomoses and undermine the skin throughout the entire surface.

These canals vary very much in size. The measure from 0·25-1 mm. in diameter. In the digitate and lobate processes they extend mainly in a longitudinal direction. Very few and scattered larger inhalent canals extend from these downward into the interior of the sponge.

They ramify very much, and so, a great many cylindrical canals are produced, which extend mainly in a longitudinal direction. They measure 0·05 mm. in diameter, and are surrounded by ciliated chambers of the ordinary shape and size. The latter open into wider exhalent, likewise longitudinally disposed, and circular canals which measure on an average 0·2 mm. in diameter and coalesce to form irregularly disposed canals which lead, extending in a tangental direction, towards the extensive lacunes of the exhalent system.

I have mentioned above that the oscula are usually surrounded by acanulous zones, and we find that these zones are destitute of a skeleton and are represented in dry skeletons by irregular grooves and depressions. We find these askeletous parts, which are more highly developed in *Euspongia canaliculata*, and which will be minutely described under that heading, filled with a very lacunose tissue with fewer chambers, and much larger exhalent canals than in the askeletous parts of the sponge. These large exhalent canals join to form a very short oscular tube. Often no oscular tube at all is developed, and the membranes which divide the lacunæ reach nearly up to the osculum itself.

SKELETON. (Plate XXXVI., fig. 3.)

The differences of the four varieties are mainly found in differences of the skeleton.

The skeleton of all the specimens agree in the following points:—

The main fibres are cored with foreign bodies, and on an average 1 mm., apart. They are not much curved and extend radially from the base of the sponge upward and outward and are mostly branched in a penicillate manner.

The connecting fibres form a very regular network, where they are of uniform thickness, but the otherwise regular meshes become irregular when the thickness of the connecting fibres varies; in the manner described above in the diagnosis of the sub-genus Irregularis.

The network is more dense in the vicinity of the main fibres than in the other parts.

The connecting fibres are always free from foreign bodies.

I. EUSPONGIA IRREGULARIS LUTEA.

The main fibres are completely filled with foreign bodies About 70% sand grains and 30% broken foreign siliceous spicules.

Their surface is rendered very uneven as the depressions between the projecting parts of sand grains and spicules are not entirely filled up with horny substance.

The diameter of the main fibres is 0·05 mm. The knobs on the surface may increase the thickness locally to 0·09 mm. The sand grains measure on an average 0·02 mm.; and the siliceous spicules attain occasionally a length of 0·1 mm.

The meshes of the connecting fibres have an average width of 0·08 mm., near the main fibre and 0·2 mm., in the portions of the skeleton which are more distant from them. The connecting fibres are thicker in the vicinity of the main fibres.

50% of the fibres are thick, with an average diameter of 0·02 mm.

40% of the fibres measure 0·01—0·017 mm.

Thinner fibres are rare, the finest measure 0·005 mm.

II. EUSPONGIA IRREGULARIS SILICATA.

The main fibres contain a number of foreign bodies in their axial portion. These are mainly siliceous spicules of other sponges. Forming 90% of the foreign bodies. The other 10% are chiefly foraminifera shells, &c., there is hardly any sand.

As the foreign bodies are only found in the centre, the surface of the main fibre is smooth.

The main fibres are generally circular in transverse section, but occasionally they are flattened to form a perforated horny plate. No foreign bodies are found in those portions of the main fibres which are converted into perforated plates.

The thickness of the main fibre is 0·1 mm.

The foreign siliceous spicules occasionally attain a length 0·14 mm

The meshes of the connecting fibres are of the same size near the main fibres as in the intermediate parts of the sponge ; occasionally very regular and measuring 0·23 mm.

The greater number, 70% of the connecting fibres are of great and uniform thickness, measuring 0·04 mm. in diameter.

There are places in the sponge where all the fibres are thick whereas in others the thinner ones prevail. These measure 0·014 in thickness, and where they prevail the net work is much more irregular.

III. EUSPONGIA IRREGULARIS TENUIS.

The main fibres of this variety are filled with dense masses of very fine grained sand. Two or more main fibres often extend for some distance parallel and close together.

Their surface is rough.

They measure 0·06 mm., in thickness. The knobs are small and close together. The foreign bodies in the main fibres are sand. No foreign spicules have been observed in the main fibres of this variety. The average size of the sand grains is 0·012 mm.

The main fibres, where they extend in close proximity, are joined to each other by bridges of horn-substance, which often are of great thickness and always free from foreign bodies.

The connecting fibres form a network which indicates an approach to the differentiation of tangental primary and radial secundry connecting fibres as it is expressed in the sub-genus Triplicis. This approach however is very slight. Occasionally little patches of a very dense net work are observed in the proximity of the main fibres. The meshes in these are very irregular and average a diameter of 0·02 mm.

The ordinary meshes are likewise very irregular in shape and size, and more regular where the main fibres are far apart, than where they are close together. Their size varies 0·1 to 0·22 mm.

The connecting fibres are remarkable for their small diameter. The thickest, which form about 50% of the whole measure 0·024 mm., whilst 40% are formed of fibres averaging 0·01 mm. in thickness. The remainder are still more slender fibres, the thinnest observed by me in this variety measured 0·004 mm.

IV. EUSPONGIA IRREGULARIS JACKSONIA.

The main fibres are cored with a dense mass of large sand grains. These, however, are only found in the central part of the fibre, so that its surface is perfectly smooth.

The main fibre has a thickness of 0·1 mm.

The sand-grains measure on an average 0·05 mm. All the sand-grains seem to be of uniform shape, and also very similar in size. They are all more or less spherical.

The connecting fibres express the peculiar irregularity of the fibres in this sub-genus, in the most striking manner.

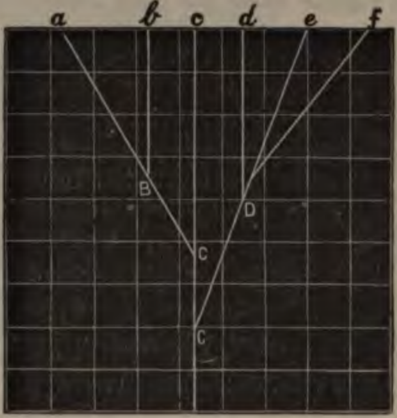
It is difficult to give measurements. The meshes are of similar shape and size in all parts of the sponge. Square ones predominate.

They measure from 0·07 to 0·17 mm. The size of the meshes is in proportion to the size of the fibres.

The fibres vary very much in thickness.

20% of the fibres are very thick, 0·04 mm. in diameter. Fibres with a thickness of 0·01 mm. form about 30% of the skeleton; whereas the remaining 50% is formed of fibres which measure only from 0·003—0·008 mm. in thickness.

The mutual relationship of these varieties to each other, and to the other sub-genera is shown in the following table. If we assume, as is usual in such cases that the connecting links, the intermediate varieties are unchanged descendants of certain stages of a changing series of generations which finally formed the most differentiated species, we will have to consider the table as a true ancestral tree. For example :—



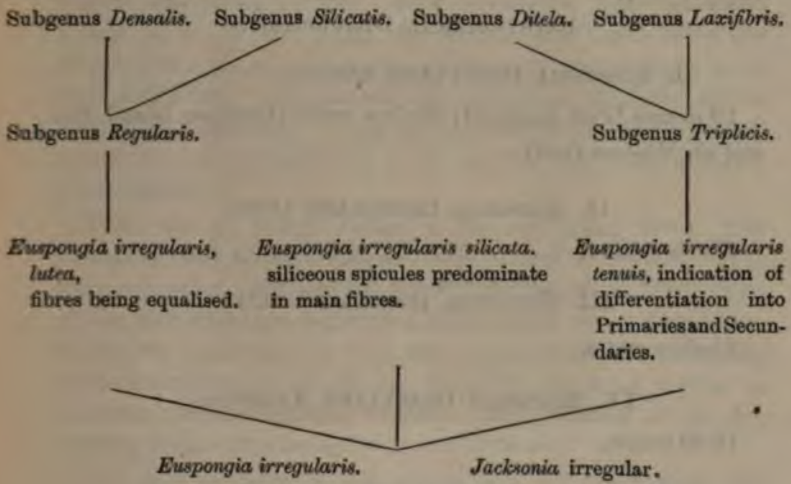
If b are unchanged descendants of B, and B is one of the real ancestors of the species a being formed, b can be considered as an ancestor.

In the same manner d is the unchanged descendant of D. D a real ancestor of e and f, and therefore d can be considered as a representative of the real ancestor.

I insert this self-evident explanation here to avoid the possibility of my ancestral tables being misunderstood.

Histology.

A muscular membrane extending in a tangential direction below the sub-dermal cavities has been observed in this species. This membrane is throughout parallel to the outer surface, and composed of the ordinary spindle-shaped muscular cells which form several layers in it. At the conuli it rises up to the surface, and there it joins the muscular system of the outer skin. This skin is perforated by the canals which lead from the sub-dermal cavities into the interior of the sponge, but otherwise it appears quite continous. There can be no doubt, that by contractions of this membrane the width of the sub-dermal cavity can be decreased, and by local contractions the water current regulated.


Subgenus *Densalis.*
Subgenus *Silicatis.*
Subgenus *Ditela.*
Subgenus *Laxifibris.*
Subgenus *Regularis.*
Subgenus *Triplicis.*
Euspongia irregularis, lutea, fibres being equalised.
Euspongia irregularis silicata. siliceous spicules predominate in main fibres.
Euspongia irregularis tenuis, indication of differentiation into Primaries and Secundaries.
Euspongia irregularis.
Jacksonia irregular.

Geographical Distribution.

I. Euspongia irregularis silicata.

South Coast of Australia, St. Vincent Gulf (Haacke); East Coast of Australia, Port Jackson (Von Lendenfeld); Fiji (Ramsay); Chatham Islands (Parker).

II. Euspongia irregularis lutea.

Mauritius (Von Haast).

III. Euspongia irregularis tenuis.

North Coast of Australia, Torres Straits (Haacke); East Coast of Australia, Long Reef (Ramsay); Chatham Islands (Parker); Mauritius (Von Haast).

IV. EUSPONGIA IRREGULARIS JACKSONIA.

East of Coast of Australia, Port Jackson (Ramsay, von Lendenfeld).

BATHYMETRICAL DISTRIBUTION.

I. EUSPONGIA IRREGULARIS SILICATA.

10 metres (Port Jackson); Shallow water (Chatham Island, Fiji and St. Vincent Gulf).

II. EUSPONGIA IRREGULARIS LUTEA.

Shallow water.

III. EUSPONGIA IRREGULARIS TENUIS.

Shallow water.

IV. EUSPONGIA IRREGULARIS JACKSONIA.

10-20 metres.

69. SPECIES. EUSPONGIA CONIFERA. Nova species.

SHAPE AND SIZE.

This species presents the appearance of half a sphere. The lower side with which the sponge is attached is perfectly flat and has a very regular circular contur. The upper side is convex and bears numerous high cones, on the summit of each of which there is a circular osculum. The only specimen measures 180 mm. in breadth and 80 mm. in height. The cones on the upper side all stand vertical and are of the same shape, although different in size. The largest are 25 mm. high and 30 mm. wide at the base, the terminal oscula are circular and measure from 6-10 mm. in diameter.

The shape of this sponge is a most exceptionally regular one.

SKELETON.

The main fibres radiate from the centre of the circular lower side laterally and vertically. They are slightly curved in a very regular undulating manner. Each undulation measures about 12 mm. in length and 5 mm. in depth. The main fibres are branched in a penicillate manner, and on an average 0·6 mm. apart from each other. They are 0·07 mm. thick, and filled throughout with small sand-grains. Their surface accordingly is roughened. The knobs are comparatively high but not very broad, and very close together.

There are no foreign bodies in the connecting fibres. The meshes of their network measure from 0·1 mm. to 0·3 mm. They are not regular. Extraordinary to say the meshes in the vicinity of the main fibres are larger than those further away from them. Where the main fibres are very close to each other the connecting fibres sometimes are simple, not branched and stand vertical on the main fibres which they connect. The thickness of the connecting fibres varies from 0·01 mm. to 0·04 mm.

The only specimen of this sponge is a dry skeleton, so that its position must be somewhat doubtful. No description of the surface, colour, canal system and histology can therefore be given.

The colour of the skeleton is a pretty light brown.

GEOGRAPHICAL DISTRIBUTION.

North Coast of Australia, Torres' Straits (Macleay).

BATHYMETRICAL DISTRIBUTION.

Probably shallow water.

II. SUB-GENUS. TRIPLICES.

The connecting fibres in the species referred to this sub-genus are differentiated into thicker tangental and finer radial ones. The former connect the radial main fibres, and are not at all or only very slightly branched, either straight or curved, in such a manner that the concave side looks towards the surface and the convex side towards the interior. These primary connecting fibres are joined to each other by secundary radial fibres which are much thinner, straight and short, in some species the primary fibres are not quite straight, but slightly bent at the joining points of the radial secundaries.

SPECIES. EUSPONGIA CANALICULATA. Von Lendenfeld.

EUSPONGIA ANFRACTUOSA. Carter (1).

I distinguish three varieties of this species, namely :—

I. *Euspongia canaliculata dura*,
II. *Euspongia canaliculata elastica* and
III. *Euspongia canaliculata mollissima.*

Carter's *Euspongia anfractuosa* mentioned above is identical with my variety *E. c. dura.*

SHAPE AND SIZE.

Euspongia canaliculata resembles in appearance certain forms of *Euspongia zimocca* F. E. Schulze (2) pretty closely. It is irregular, massive, spherical, attached by a small, slightly protruding portion of the broad base and bears on its upper side numerous short digitate processes, which are hollow.

These are about as long as broad and rounded on the summit. They measure 10-20 mm., both ways.

The size of the whole sponge is the same in the three varieties, the largest specimens measure 150 mm., in breadth and 100 mm., in height.

The skeleton in particular, and to a certain extent also the dry specimens show deep, and irregular more or less longitudinally disposed grooves in the surface, which occasionally reach down to the central cavity. The developement of these grooves or canals and of the finger shaped processes is different in the different varieties, and by these external differences the varieties can be readily distinguished.

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(1) *H. J. Carter.* Description of Sponges from Port Phillip Heads, South Australia, continued. Annals and Magazine of Natural History. Series 5, Vol. XV., p. 316.

(2) *F. E. Schulze.* Untersuchungen über den Bau und die Entwickelung der Spongien, VII., Mittheilung ; Die Familie der Spongidæ. Zeitschrift für wissenschaftliche Zoologie. Band XXXII., Seite 615.

In *Euspongia canaliculata dura*, the digitate processes are most regular, dome-shaped and large, measuring 20 mm., in diameter, whilst the grooves are very narrow and not very numerous.

The skeleton of this variety consequently possesses a comparatively smooth appearance.

In *Euspongia canaliculata elastica* the digitate processes are longer but more slender, measuring 12 mm., on an average in diameter and 18 mm., in height. The skeleton of this variety presents a much more irregular aspect because the grooves are so numerous and broad that the sides of the digitate processes appear entirely cut up by them into isolated erect portions.

In *Euspongia canaliculata mollissima* the digitate processes are much smaller than in either of the foregoing varieties and not so numerous. They do not take up the whole of the upper surface of the sponge.

The whole of the surface is covered by a network of meandric grooves, which are of similar dimensions as in *Euspongia canaliculata dura*. These grooves form anastomoses and in this way cut the whole of the surface up into numerous irregularly shaped fields. This of course only applies to the skeleton.

COLOUR.

The colour of the live sponge is brownish grey. It spirits it becomes lighter. Beach worn skeletons of *Euspongia canaliculata dura* are of a dirty greyish-yellow colour. Those of the other two varieties are reddish brown the colour of "burnt siena."

RIGIDITY.

The skeletons of all the three varieties are very elastic, but at the same time much harder than any variety of *Euspongia officinalis* known to me. In consequence of this rigidity, *Euspongia canaliculata* cannot be used for similar purposes as the bathing sponge.

As the variety-name implies *Euspongia canaliculata dura* is the hardest. 1 kilogramm weight compresses a large specimen only about 3 mm. *Euspongia canaliculata elastica* is very much softer. 1 kilogramm compresses it about 8 mm. *Euspongia canaliculata mollissima* is a little less elastic than the two other species and about as hard as *Euspongia canaliculata elastica.*

SURFACE.

The surface is the same in the three varieties. There are no conuli, and it therefore appears very smooth. In this respect our species differs widely from *Euspongia officinalis* and many other species. With a magnifying glass one perceives that the surface is covered by a very regular network of a uniform appearance throughout. There is no difference whatever in the surface of the extensive vestibule spaces and the external surface. This network is similar to the one described above of *Euspongia irregularis.* It is produced by a network of raised lines on the surface. The meshes are 0·16 mm. wide, and the lines of the network itself 0·08 mm. broad.

The protruding net is filled with sand-grains, there are however, no siliceous spicules as in *Euspongia irregularis.* The sand-grains measure from 0·15 to 0·28 mm. In the meshes of this network the pore-sieves are situated, which possess a great many small pores from 8-20 in number.

These pores are the commencement of the inhalent canals.

Corresponding to the grooves in the skeleton described above, there are askeletous portions of the sponge. These are accordingly disposed mostly in longitudinal lines. On their surface, which is not different from the surface of other parts, except that it sometimes appears more or less retracted or collapsed, the small circular Oscula are found which measure 1-2 mm. in diameter. The Oscula are disposed in lines, and on an average 10-15 mm. apart.

CANAL SYSTEM.

A. Vestibule spaces.

On the summits of the digitate processes round holes are found, which resemble Oscula very closely These are however the apertures of the system of Lacunæ, which must be considered as a vestibule space, and have nothing to do with the exhalent system. The vestibule cavity consists of wide canals with circular transverse section, measuring from 5 to 12 mm. in diameter. These canals are mostly upright, vertical and form here and there anastomoses, about ½ to ⅔ of the volume of the sponge is taken up by these vestibule spaces.

They are connected with the outer world only by the Pseudoscula on the summits of the processes. There are no other apertures, so that the whole space appears as a perfectly closed Pseudogaster. No Oscula open into these spaces, their walls are pervaded only by the inhalent pores, and so these cavities appear as an outward appendage to the inhalent system; they are perfectly homologous to the vestibule spaces described above of *Euspongia irregularis.*

B. True Canals.

The canal system of our sponge is very remarkable. The pore sieves are pervaded, as mentioned above by a great number of very small pores. These are circular and can be entirely closed at the option of the sponge. In consequence of this, the number in each pore sieve found open and visible is very variable. The greatest number counted by me in one pore sieve was 20. They are circular and scattered regularly over the whole of pore-sieve. They measure when dilated 0·01 mm. in diameter. The pore-sieve itself is a very fine skin 0·01 mm. thick and attached to the sand-net which divides the pore sieves from each other.

These structures are perfectly similar in the outer, and inner side of the lamellous body of the sponge. The pores of the inner surface open into the vestibule, those of the outer surface into the outer world. Below the pore-sieves extensive sub-dermal cavities are met with. (Plate 37, fig. 1.) These are larger below the inner surface than below the outer surface. The sub-dermal cavities below the inner vestibule surface are irregular, tangental, and mostly longitudinal canals of an irregularly oval transverse section.

Their largest diameter may attain 3 mm. Such immense sub-dermal cavities are rare.

The sub-dermal cavities below the outer surface are similar, irregularly longitudinal canals, which, however, are very much narrower. These are also much more flattened tangentally and attain a width of 1 mm. and height of 0·5 mm.

From these extensive cavities canals extend down towards the interior of the sponge, which have an average diameter of 0·1 mm., a circular or oval transverse section, and which extend likewise in a more or less longitudinal direction. They ramify continually, and the smallest final ramifications which have the same shape as the larger canals, measure 0·02 mm. in diameter. (Plate 37, fig. 1). The ciliated chambers form ¾ of spheres and measure 0·032 mm. in diameter. The exhalent canals are similar in shape, size and direction to the inhalent ones, and join to form larger stems, which no longer extend longitudinally but curve towards the askeletous portions of the sponge attaining a more and more transverse direction the larger they become. The askeletous portions of the sponge. (Plate 37, fig. 1), are very much less dense than other parts and consist mostly of wide Lacunæ, separated from each other by tender membranes as in *Euspongia irregularis*. These Lacunæ join and finally open into the short and wide oscular tube. They average a diameter of 0·6 mm., the membranes which divide them from each other are only 0·005 mm. thick in certain places. In portions also of the askeletous part ciliated chambers are found (Plate 37, fig. 1), particularly in the depth; no chambers open directly into the large oscular tube which measures 1-2 mm. in diameter.

Often the skeleton is interrupted throughout the entire width of the sponge lamella between the vestibule space and the outer surface. In such cases the lacunose tissue formed by the congregation of the exhalent canals extends also down to the vestibule space.

No oscula are found either in the skeletous part or in the walls of the vestibule cavity.

SKELETON.

(Plate 36, fig. 1.)

The main fibres of the skeleton radiate from the point of attachment outward and upward. They extend mainly in a longitudinal direction and branch in a more or less penicillate manner. The main fibres are joined on the surface to the sand-armour, and it is clearly visible that their sand-core is a direct continuation of the sand in the skin.

The main fibres curve gracefully outward in their distal portions and all their ends are joined to the *outer* skin. Never is a free termination of a main fibre formed in the interior. This shows that these main fibres grow in the same manner, as the main fibres of Halme, namely just below the outer skin.

It is also very remarkable that no main fibres are joined to the inner skin on the vestibule side of the lamella.

The consequence of this is that the skin can be drawn off on the inner side, whereas it appears firmly attached on the outer.

In detail the main fibres, although always completely filled with foreign bodies differ in the different varieties, and these details shall be described below.

The connecting fibres form, as mentioned above in the diagnosis of the sub-genus, two systems. Thicker primary tangental, and thinner secundary radial connecting fibres are distinguishable. The mode of ramification varies in the varieties, and shall be described below. The connecting fibres never contain foreign bodies.

It is most remarkable that round the grooves in the skeleton filled by the lacunose, askeletous tissue, the connecting fibres terminate with sharp points. (Plate 37, fig. 1, b.) This is evidently a defensive arrangement against foreign intruders which might attempt to get into the body of the sponge from the wide exhalent lacunose or from the oscular tube.

I.—EUSPONGIA CANALICULATA DURA (Plate 36, fig. 1.)

The main fibres are slightly and gracefully curved, on an average 1·3 mm. apart they taper towards the distal end which supports the dermal armour of sand. They measure 0·1 mm. in thickness and have a smooth surface. They are entirely filled with foreign bodies, which are small sand grains measuring for the most part 0·025 mm. with a few short fragments of foreign spicules.

The connecting fibres are differentiated into primary tangental and secondary radial ones very much more clearly than in the other varieties. The former are on an average 0·3 mm. apart. The primary connecting fibres are either straight or gracefully curved, appearing like ropes supported by the upright main fibres and slightly depressed in the centre. They do not show the slightest trace of curvatures or angles at the joining points. Rarely they devide into two roots in the vicinity of the main fibres. Generally they are perfectly simple throughout, and do not ramify at all. At the base they extend in a trumpet-shaped manner to join the main fibre. They measure 0·03 mm. in thickness on an average. The thickness, however, seems to be in correlation with the length, in as much as the longer fibres are always thicker than the shorter ones.

The secondary connecting fibres are not regular but still more so than in the other varieties. Many of these fibres are quite simple, and extend in a more or less radial direction, connecting the primary fibres with each other. They generally do not stand vertical on the primaries, but are more or less oblique. Many appear ramified and altogether they form an irregular network of fibres of varying thickness which connects the primaries.

Their thickness varies from 0·01 to 002 mm. They are attached to the primaries by a broad trumpet-shaped extended basis.

II. EUSPONGIA CANALICULATA ELASTICA.

The main fibres are slightly and gracefully curved and taper more abruptly toward the end, than in the foregoing variety. The main fibres have a smooth surface and measure 0·1 mm. in diameter, they are a little closer together than in the foregoing variety. They contain axial foreign bodies, which, however, are not near so numerous as in *Euspongia canaliculata dura.* These foreign body are mostly sand-grains, measuring on an average 0·02 mm. The connecting fibres are differentiated into primaries and secundaries not so distinctly, however, as in the variety described above. Particularly we find not so great a difference in thickness.

The primaries are on an average 0·4 mm. apart and form angles at the joining points of the secundaries. They, therefore, do not appear like graceful curves pendant between adjacent main fibres, but rather as broken lines, composed of longer or shorter straight portions which are joined at angles approaching 180° very closely. They measure 0·028 mm. in thickness. Also here we find those which extend between distant main fibres thicker than those which join two more adjacent main fibres.

The secundaries are rarely simple, mostly they ramify and anastamose so as to form a regular network, the meshes of which measure 0·3 mm. on an average.

The thickness of the secundaries varies from 0·005 to 0·025 mm. The very thin ones are rare. The intermediate ones predominate.

As the primaries are bent at the joining points and the secundaries approach the thickness of the primaries the differentiation between primaries and secundaries becomes indistinct.

Particularly this becomes apparent between main fibres, which lie close to each other where the network is similar to that of the subgenus Irregularis, whereas between the more distant main fibres the differentiation is clearly visible.

III. EUSPONGIA CANALICULATA MOLLISSIMA.

The main fibres of this variety are very different from those of the other varieties. They are on an average 0·9 mm. apart and 0 14 mm. thick. The surface is roughened by a few small knobs. These fibres are never straight or gracefully curved, but appear irregularly bent and twisted a peculiarity which characterises the variety. They contain foreign bodies in great abundance. These are very small sand-grains, measuring only 0·014 mm.

The differentiation between primary and secundary connecting fibres is still less clearly expressed, than in the foregoing variety, although, also in this one, the two can be distinguished at least in certain parts of the skeleton. The primaries are formed of straight portions which join at angles, not so near 180° as in the foregoing variety. Occasionally the portions between the joining points are slightly curved. These fibres are 0·4 mm. apart and on an average 0·032 mm. thick. Their thickness is, however, subject to unusual variations and not proportionate to the length of the fibres as in the other varieties. The secundaries form a very irregular network, and there are no simple unbranched ones at all. The meshes average a diameter of 0·2 mm. The fibres vary very much in thickness from 0 008 to 0·03 mm. Some of them are as thick as the primaries.

It will appear from this that there is a gradation in the development of the "triplicis" mode of ramification represented by these varieties. That the specimens, which are considered by me as varieties of this species really are very nearly related, can hardly be doubted when it is considered that their anatomy and even shape is so very similar. This shows then that the mode of ramification of the connecting fibres is not a thing of much systematic value, as has been asserted by Bowerbank and others, and that here again, as in so many other cases the idea of constancy in a certain organ has been broken down by more extensive researches.

The varieties *Euspongia canaliculata mollissima* and *elastica* connect the variety *dura* closely with *Euspongia irregularis.* A further developement in the direction indicated has been attained by *Euspongia Matthewsi*, the representative of the following subgenus. The developement of this kind of ramification of connecting fibre is already indicated in the variety *tenuis* of *Euspongia irregularis*.

It can be made clear by a perusal of the following table wherein unchanged descendants of the true ancestors are enumerated in a series which probably represents the true ancestral descent very closely :—

Subgenus Laxifibris   Subgenus Ditela.

Euspongia canaliculata dura.
Primaries straight.

Euspongia canaliculata elastica.
Primaries slightly bent.

Euspongia canaliculata mollissima.
Primaries much bent.

Euspongia irregularis tenuis, indication of differentiation into Primaries and Secundaries.

This table also shows the mutual relationship of the different varieties.

HISTOLOGY.

The remarkable structure of this sponge led me to investigate its histology more closely and I have arrived at some interesting results differing to a great extent from the histology of other sponges as described by F. E. Schulze, Vosmaer, Poléjaeff, and myself.

SKELETON.

The fibres are highly colorable, more so than those of other Spongidæ. The connecting fibres consist of perfectly clear and transparent Spongiolin and do not show a trace of being composed of concentric layers.

There is of course no doubt whatever, that they have been formed like those of other horny sponges, but it is remarkable that all the layers have precisely the same refractive power.

Only the outermost layer, the youngest, appears slightly different under a high power in as much, as it absorbs coloring matter less than the others and also refracts the light not so much as the central parts. This is visible in a very striking manner in fine sections. It must be assumed, that the outermost layer, which consists of newly formed spongiolin is less dense than the older spongiolin in the centre and probably there is a certain amount of water in it, which is absent in the older central portions. I have some time ago (1) expressed my opinion that the newly formed Spongiolin is slimy. The structure of the fibres of our sponge are of such a nature as to corroborate this. The Spongiolin is a *hardened slime*, and it hardens by a process of drying, that is losing the water with which it was originally mixed.

This slime is poured over the fibres or foreign bodies by the spongoblasts and there it hardens to spongiolin.

The outer horny layers which enclose the foreign bodies in the core of the main fibres, however, are clearly stratified. This difference would point to a difference in the formation of these two. It appears that the connecting fibres are produced in a short time and do not grow in thickness after they have once been formed, whereas the main fibres occasionally receive a fresh coating of spongiolin so as to strengthen them.

No increase in strength in the connecting fibres is required as the sponge grows in size, but the strain on the main fibres is of course increased, so that it also appears advantageous that the thickness and strength of the main fibres should be increased. The spongiolin produced at one and the same time will be of the same nature, so that the layers formed by it are not rendered visible. For this reason the rapidly formed connecting fibres do not show any stratification.

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(1) *R. v. Lendenfeld.* Ueber Cœlenteraten der Südsee II., Mittheilung, Neue Aplysinidæ. Zeitschrift für wissenschaftliche Zoologie. Band XXXVII., Seite 269.

The spongiolin produced at different times is slightly different so that successive layers of spongiolin formed at greater intervals of time will show their limits. This is the case in the main fibres.

The axial thread is very well developed in the connecting fibre and clearly visible, it consists of a granular mass and has a thickness of 0·0004 mm. The connecting fibres join generally in such a way that three fibres radiate out from one point. On close examination it appears that two of these are portions of one and the same continuous fibre with a continuous axial thread, whereas the other grows out from it at the side. The axial thread of the latter is not connected with the continuous axial thread of the former. It terminates moreover with a trumpet shaped extension on the surface of the other fibre. In the same way also the axial threads terminate, where the connecting fibres join the main fibre. This shows clearly that the three fibres radiating from one joining point never are equivalent, but that the one is a primary fibre to the side of which the other has attached itself afterwards and therefore appears as a secundary. Light is thrown by this peculiarity on the growth of the connective fibres.

In the description of the skeleton I have mentioned that the connecting fibres terminate at the sides of the grooves in the skeleton with sharp points. It is always the primaries which terminate in this remarkable manner (Plate 37, fig. 1, b.) The points are very sharp and abrupt so that the contour is somewhat similar to a Roman short sword's point. The axial thread terminates a little behind the point.

The points stand very close together and the whole is a most effective defensive arrangement. I am not aware that such free and pointed terminations have been observed in other horny sponge.

MUSCULAR LAMELLÆ.

The skeletous part of the sponge is divided from the askeletous portion by a membrane, which extends down from the outer surface to the bottom of the groove. This membrane is situated just in front of the points of the connecting fibres (Plate 37, fig. 1) and surrounds the part of the sponge occupied by the large lacunæ of the exhalent canals. This membrane consists of radially disposed parallel, elongate, spindle shaped cells. These measure 0·032 in length and 0·0015 mm., in thickness, in the centre. The ends of these cells are very slender forming extremely find threads. In the middle of the length but not in the axis of the cell the nucleus is situated, it lies near the side and is very elongate, oval situated longitudinally. It measures 0·0034 mm., in length and 0·0011 mm., in width. The cell is entirely filled by a very granular and highly colorable protoplasm. The granules are remarkable for their large size, which may be estimated at 0·00025 mm. The ground substance in which these granules are imbedded does not refract the light very much, the granules however are highly refracting. The ground substance refracts the light *simply*, whilst the granules show when examined with the polariser that they *refract the light doubly* in a similar manner as the discs in the straited muscles of higher animals. These granules are scattered throughout the cell in an irregular manner, but still one notices that they appear to have a tendency to group themselves in transverse rows or discs. In this way the cells of the muscular membrane of our sponge appear as an interesting transition form from the simple undifferentiated contractile elements of sponges to the striated muscular cells of higher Cœlenterates. It will be known to the reader that striated muscular elements, which are so widely distributed in the latter and have even been found in Hydroid Polyps (1), do not occur in sponges. The cells in this organ of our sponge are the nearest approach to them. I have been informed by Mr. Haswell, that he has discovered a similar transition form in certain radiating muscular cells round the stomach of a worm.

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(1) *R. v. Lendenfeld.* Muscular Tissues in Hydroid Polyps. Proceedings of the Linnean Society of New South Wales. Vol. IX., Pt. 3, p. 635.

That the membranes in question really are muscular is rendered particularly evident by the great differences in the degree of depression of the skin which covers the lacunose askeletous parts of the sponge, which are an indication of extensive movements. The latter can only be caused by contractions of this membrane.

This membrane is perforated at the base by the exhalent canals, which lead from the skeletous portion of the sponge into the askeletous part, taken up by the lacunæ of the exhalent system.

NERVOUS SYSTEM.

At its distal margin the muscular membrane described above is thickened. (Plates 37, fig. 1, i.)

In transverse sections through this distal thickening we find that no spindle-shaped granular cells take part in its formation but that it is composed of a highly colourable granular mass in which large nuclei are contained. The latter are spherical and measure 0·002 mm. in diameter. From the sides of this structure granular threads extend in a tangental direction and from its distal surface slender, straight, or curved spindle-shaped cells arise. The distal part of these reaches the outer surface. The cells are curved in such a manner that this part is always nearly vertical to the surface. To attain a vertical position of the end it becomes necessary for those spindle-shaped cells, which originate at the side of the swelling, to curve.

These cells measure 0·02 mm. in length. At the ends they are 0·0005 mm. thick, but in the thickest central part they measure 0·00015 mm. across. They are filled with granular protoplasm, which imbibes staining fluids very readily and is turned brown by the action of osmic acid. In it we find, in the central swelling, an oval nucleus 0·002 mm. long and 0·0006 mm. broad, and a few large and remarkable granules which appear particularly after. osmic acid treatment as very distinct black spots.

I am of opinion that this structure must be considered as an organ of sense comparable to the ring nerve of craspedote Medusæ or the sensitive and ganglia cells, which form a circular zone in the entoderm of the manubrium of certain hydroid polyps.

The membrane surrounds, as mentioned above the lacunose portion, and it is crowned by this nervous structure, which accordingly appears as a sensitive zone round the askeletous area. The distal swelling of the membrane consists of ganglia cells, the nuclei of which are apparent, the limits of which however are indistinct, there is only a slight indication of the formation of limits.

The spindle-shaped cells in the skin should be considered as sensitive elements and their basal processes as nerves, which lead from the sensitive cells to the ganglia cells. These processes are short in the cells just above the ganglia cells and longer as the cells are further removed. The tangental granular threads represent tangental nerves which lead from the ring nerve to other parts of the surface.

This nervous system, as also that in other sponges, is mesodermal, and can therefore not be directly compared to the analogous structures in higher Cœlenterates, but as we find the embryonic lamellæ so very indifferent in these low animals no great value can be attached to this difference. It is, however a further illustration of the peculiarity of sponges first pointed out by Marshall (1) that all their organs are mesodermal, that even the nervous system which throughout the animal kingdom is ectodermal or entodermal (Hydroid polyps, Actinia), is constituted of mesodermal cells in sponges.

There can be little doubt that there is a connection between the muscular cells of the membrane and the ganglia cells, although I have not been able to ascertain what this connection may be.

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(1) *W. Marshall.* Die Ontogenie von Reniera filigrana, O. Schmidt. Zeitschrift für wissenschaftliche Zoologie. Band XXXVII., Seit 497.

The nervous elements of sponges have been developed from neuro-muscle cells or also from indifferent mesodermal cells, the former is rendered more probable by their distribution.

The elements of sponges are derived from the different embryonic layers as follows :—

ECTODERM :

Flat Epithel cells.

ENTODERM :

Flat Epithel cells.
Collar cells.

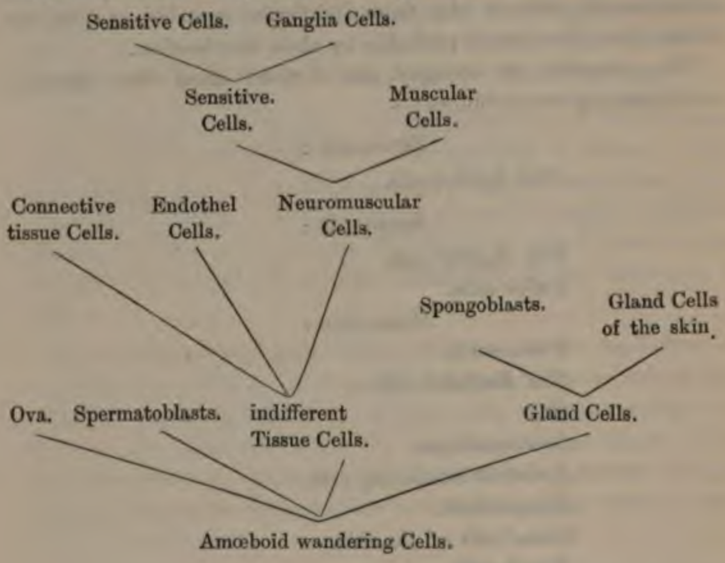
MESODERM :

Tissue cells.
Flat Endothel cells.
Ova.
Spermatoblasts.
Amœboid wandering cells.
Spongoblasts.
Gland cells of the skin.
Muscle cells.
Ganglia cells.
Sensitive cells.

The developement of the different Mesodermal cells may have been the following :

1. The *amœboid wandering cells* have retained the appearance and mode of life of those cells which originally grew inward from the outer coating of the Blastula to form the mesoderm.
2. From these the *ova, spermatoblasts* and *indifferent tissue cells* have been derived ; also the *Spongoblasts* and *gland cells of the skin* have descended directly from them.
3. From the *indifferent tissue cells* neuro-muscular elements were developed, which again further differentiated to form the *ganglia* and *sensitive cells* on the one hand, and the true *muscular cells* on the other ; also the connective ordinary *tissue cells* are derived from them.

This is made clear by the following table :—



GEOGRAPHICAL DISTRIBUTION.

I. EUSPONGIA CANALICULATA DURA.

West Coast of Australia, (Baily) ; East Coast of Australia, Port Jackson, (Von Lendenfeld.)

II. EUSPONGIA CANALICULATA ELASTICA.

South Coast of Australia, Port Phillip, (Von Lendenfeld.)

III. EUSPONGIA CANALICULATA MOLLISSIMA.

East Coast of Australia, Port Jackson, (Ramsay.)

BATHYMETRICAL DISTRIBUTION.

I. EUSPONGIA CANALICULATA DURA.

Shallow water ? Western Australia. 20 metres Port Jackson.

II. EUSPONGIA CANALICULATA ELASTICA.

10 metres.

III. EUSPONGIA CANALICULATA MOLLISSIMA.

15 metres.

71. SPECIES. EUSPONGIA SEPTOSA. Ridley.

EUSPONGIA SEPTOSA. Ridley (1).
SPONGIA SEPTOSA. Lamarck (2).

SHAPE AND SIZE.

Euspongia septosa is attached to two or more stones over which, it forms horizontally expanded laminæ which rise into sub-cylindrical lobes 5 to 7 mm., in diameter.

COLOUR.

The surface has a dark grey colour, in spirits; the interior dull pale brown, subtransparent. Skeleton fibres amber yellow, usually homogenous in appearance throughout.

SURFACE.

The surface is broken up by a number of sharp prominent ridges and points 1 to 3 mm., high; the intermediate surface is rough. It has somewhat the appearance of a honey comb.

CANAL SYSTEM?

SKELETON.

Main fibres set approximately at right angles to surface, thickness about 0·6 mm.; primarie connecting fibres approximately vertical to main fibres, about ·035 to ·053 mm., in thickness, forming with some secundarie connecting fibres rounded-angled meshes, 0·14 to 0·21 mm., in diameter, between the main fibres which are about

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(1) *Stuart O. Ridley.* Spongiida. Report on the Zoological Collection made in the Indo-Pacific Ocean, during the Voyage of H.M.S. Alert, 1881-2. British Museum of Natural History, Catalogue 1884, p. 381.

(2) *de Lamarck.* Sur les Polipiers empâtés. Annales des Museum. Tom. 20, p. 373, 1813.

0·42 mm., apart. Main fibres cored to some little distance from surface by a usually single series of small foreign bodies; connecting fibres uncored.

RIGIDITY.

Texture of sponge in spirit very tough and elastic.

GEOGRAHPICAL DISTRIBUTION.

North Coast of Australia, Torres Straits, Alert Island; (Alert.)

BATHYMETRICAL DISTRIBUTION.

15 metres.

III. SUB-GENUS. LAXIFIBRIS.

The skeleton of this sub-genus is very remarkable and shows, as indicated above, a further developement of the skeleton of *Euspongia canaliculata dura.*

The main fibres resemble those of Hircinia in as much as they are formed of a trellis work of densely interwoven fibres. The longitudinal ones are thicker than the transverse ones and one or two are particularly well developed and contain foreign bodies.

The connecting fibres are differentiated into primary and secundary fibres.

The primaries are not ramified, long smooth and gracefully curved. They are never bent at the joining points.

The secundaries are very short and thin, always simple and straight, and connect the primaries, both are free from foreign bodies.

72. SPECIES. EUSPONGIA MATHEWSI. Von Lendenfeld.

COSCINODERMA LANUGINOSUM. Carter (1).

COSCINODERMA LANUGINOSUM. Carter (2).

In the discussion of the varieties of *Euspongia conaliculata* I have given the reason for not considering peculiarities in the ramification of the connecting fibres of sufficient value to base genera thereon. For those reasons and also because the chagrin like surface is found in other species I do not consider the genus Coscinoderma Carter (1) as necessary and I place his and also some species which Poléjaeff (2) assigned to this genus in the genus Euspongia.

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(1) *H. J. Carter.* Contribution to our Knowledge of the Spongida. Annales and Magazine of Natural History. 5th Series, Vol. XII., No. 71, p. 309.

(2) *H. J. Carter.* Descriptions of Sponges from the neighbourhood of Port Phillip Heads, South Australia. Annales and Magazine of Natural History, 5th Series, Vol. XV., No. 88, p. 318.

I have examined a dry sponge kindly forwarded to me by Mr. Mathew, R.N., which I named after him as above. Only afterwards I ascertained that this species is probable identical with Carter's species above mentioned.

The description of the soft parts is taken from Carter l.c., that of the skeleton is original. The notes given me by Mr. Mathew corroborate Carter's description.

This sponge is excellently adapted for bathing purposes and used for that purpose in the Caroline Islands.

SHAPE AND SIZE.

Stipitate, expanding from a round stem in the form of a battle dore-shaped or triangular lamella, with conical processes on the upper margin. It measures 210 mm., in width and height and 40 mm., in thickness (Carter's largest specimen). Larger specimens were seen by Mr. Mathew.

SURFACE.

Surface for the most part even throughout, interrupted only by a small proliferous projection or out-growth on one side and a line of vents situated pandean pipe like along the upper border, between which the structure is denticulated. Pore sieves in the interstices of the cribriform incrustation which forms a reticulate chagrin like structure in consequence of the abundance of sand grains etc., in this net-work. The meshes of this net-work are 0·52 mm., wide. The lines a little wider.

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(1) *H. J. Carter*. Contributions to our Knowledge of the Spongida. Annales and Magazine of Natural History. 5th Series, Vol. XII., No. 17, p. 309.

(2) *N. Poléjaeff*. The Voyage of H.M.S. Challenger. Part XXXI. Report on the Keratosa, p. 50 ff.

COLOUR.

When fresh, grey, the same in spirits, but faint yellow internally. The beachworm skeletons are light grey.

CANAL SYSTEM.

Carter mentions sub-dermal cavities and vents on the margin. I am not able to judge from his description, but I would not think it unlikely that the vents are not vents at all but inhalent pseudoscula, similar to those described above of *Euspongia irregularis* and *Euspongia canaliculata*. A re-examination of the specimens will be necessary to decide this.

SKELETON. (Plate XXXVI., fig. 6.)

Carter says that "the wool-like character of the fibre, owing to its being so small and uniform *is* peculiar." That Carter put this "is" in italics firstly led me to believe that the sponges under consideration are identical. I have certainly never seen any sponge skeleton similar to the skeleton of this species in this respect.

The main fibres, as mentioned above in the diagnosis of the sub-genus, consist of a trellice work of fibres, and form a very dense network with small irregular meshes. In other words a perforated column. In this structure continuous thick fibres can be traced for short distances which are cored with foreign bodies, chiefly very fine grained sand. The whole structure measures 0·10 mm. in thickness. The fibres which form it, are 0·01-0·09 mm. thick and the meshes average a width of 0·08 mm.

These very peculiar main fibres were not seen by Carter, but as they are far apart and difficult to find I do not attach much importance to that.

These main fibres ramify irregularly, and it appears that occasionally, particularly at the joining points, the trellice work of which they consist becomes more loose and irregular, and in such localities there are no main fibres accordingly.

The primary connecting fibres are very long. I have traced some to a length of 5 mm. They extend from one main fibre to the other, they are vertical to the main fibres. The reason why they are so long, is because they do not connect the adjacent main fibres, but they extend often between two fibres far apart from each other. The consequence is that they cross each other in every direction. The most approximate points of any two crossing fibres are joined by a short secundary fibre which is straight, and very thin. These secundaries are all of uniform length, namely, 0·05 mm. Their thickness is 0·0058 mm. and also very uniform. All the primary connecting fibres are of the same thickness, namely, 0·018 mm.

It will appear from the above that the ramification is a most complicated and unusual one. Teased out specimens and also sections are very puzzling, and it is only by means of making sections in three directions at right angles to each other, that I was able to attain a clear insight into the structure of the skeleton of *Euspongia Mathewsi.*

Nothing is known of the Histology of this species.

GEOGRAPHICAL DISTRIBUTION.

South Coast of Australia, Fremantle (Carter); Port Phillip (Carter); tropical part of Pacific Ocean, Caroline Islands; Ponape (G. T. Mathew).

BATHYMETRICAL DISTRIBUTION.

42 Metres. Port Phillip.

IV. SUB-GENUS. DITELA.

The interior portion of the skeleton consists of radial main fibres, primary tangental and secundary, radial connecting fibres. This part of the skeleton is very similar to the skeleton of *Euspongia canaliculata dura.* The primaries are always simply curved or straight. They are never bent at the joining points. The secundaries are always quite simple and vertical to the primaries.

In the surface there is a very dense and irregular network which does not resemble the network of the interior at all. This is similar to the skeleton of *Euspongia officinalis* and to the interior of the skeleton of the species of the genus Densalis.

73. SPECIES. EUSPONGIA REPENS. Von Lendenfeld.

DITELA REPENS. Selenka. (1)

Selenka did not describe this species very minutely, but his excellent figure makes it sufficiently certain that the sponge to be described below, and Selenka's Ditela repens are identical.

SHAPE AND SIZE.

In outer appearance this sponge, particularly the skeleton of it, resembles some forms of chalinid sponges very closely, and it forms also in other respects a transition form between my subfamilies Sponginæ and Chalinospinæ. It is digitate, creeping and irregular. The digitate parts coalesce occasionally to form a lamellose extension, usually however they only grow together in a few places where they touch, They attain a length of 100 mm., are cylindrical, terminally rounded, and from 12-20 mm. in diameter. There thickness is generally very uniform throughout. My specimens are more regular than the one depicted by Selenka.

SURFACE.

The surface of the skeleton, and also of the animal, is slightly conulated. The conuli are small and low, on an average, 1 mm. apart and 0·4 mm. high. They are disposed very regularly. No sand is found in the skin, which is strongly protected by the dense Ditela network of fibres in it.

The oscula measure from 2-4 mm., are circular and occasionally very slightly raised over the surface. They are situated terminally, but also occur on the surface, particularly of large and irregular digitate pieces in great numbers.

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(1) *E. Selenka.* Ueber einige neue Schwämmme aus der Südsee. Zeitschrift für wissenschaftliche Zoologie. Band 17, Heft 4, 1867, p. 567.

RIGIDITY.

The skeletons of these sponges are very tender and soft, and can be pressed between the leaves of a book like a flower.

COLOUR.

In spirits yellow, The skeleton has a brownish hue.

CANAL SYSTEM.

Selenka had only dry specimens, and I only saw some half decayed ones picked up on the beach, so that I cannot give any reliable account of the configuration of the canal system.

SKELETON. (Plate 36, fig. 5.)

The skeleton is very regular. It consists of main fibres which extend in a longitudinal direction along the Oscular tube which, in the shape of a hollow cylinder, takes up the centre of the digitate processes. From time to time, these fibres emit branches, which gracefully curve towards the surface, spreading like a fountain, and terminating in the superficial skeleton.

These main fibres are on an average 1 mm. apart and measure 0·04 mm. in thickness. They are filled with large sand-grains averaging 0·008 mm., which are so abundant as to cause the surface of the fibre to become very rough. The knobs are large and high.

In the interior of the sponge a very regular net-work of connecting fibres is met with. These are differentiated into primaries and secundaries. The former are simple, straight or slightly curved, very rarely branched, and never bent at their joining points with the secundaries. They are vertical to the main fibres, and connect the approximate fibres.

They are always free from foreign bodies and measure 0·015 mm. in thickness. They are particularly far apart. The interval averages 0·2 mm.

These primaries are connected by the secundaries. The latter are always straight, unbranched and simple, and generally more or less vertical to tke primaries. Their thickness varies from 0·0033 to 0·01 mm. They are, like the primaries not at all numerous, so that the whole network in the interior attains such wide meshes that I would not place this sponge in the genus Euspongia at all, where it not for the very dense network of connecting fibres which forms a thick superficial layer.

This latter is totally different from the network in the interior. It is formed of an ordinary dense uniform and irregular network, and forms a layer nearly 0·5 mm. thick on the surface.

The fibres which form this network possess an average thickness of 0·017 mm. (0·01-0·015 mm. Selenka l.c.), and the meshes of it are 0·05 mm. wide and rather irregular.

O. Schmidt (1) established his genus Ditela for a sponge with such a special superficial skeleton, he afterwards (2) however, united Ditela again with Spongia. It belongs doubtlessly to Euspongia (3.) The sub-genus of this name which I have established above for this species is not identical with O. Schmidt's (l. c. I.), original genus Ditela, as the interior skeleton of the two differ, but I have adopted it for the sake ot simplicity, as a name with which we are familiar, and of which we know that it means a sponge with a special superficial skeleton.

Nothing is known of the histology of this sponge.

GEOGRAPHICAL DISTRIBUTION.

South Coast of Australia, Port Phillip, (F. Mueller, Selenka, Von Lendenfeld.)

BATHYMETRICAL DISTRIBUTION.

Shallow water?

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(1) *O. Schmidt.* Die Spongien des Adriatischen Meeres, 1862. Seite 24.

(2) *O. Schmidt.* Supplement der Spongien des Adriatischen Meeres, enthaltend, Die Histiologie und Systematische Ergänzungen, 1864. Seite 27.

(3) *F. E. Schulze.* Untersuchungen über den Bau und die Entwicklung der Spongien. Siebente Mittheilung. Die Familie der Spongidæ. Zeitschrift für wissenschaftliche Zoologie. Band XXXII., Seite 620.

V. SUB-GENUS. REGULARIS

The connecting fibres are of similar thickness in one and the same portion of the sponge, and the differences in their diameter is never so great as in the foregoing species. The variations do not as a rule exceed 10% of the average measurement.

The meshes of the network formed by these fibres are also accordingly much more regular. They are small and the connecting fibres are very thin as compared to those of the species in other sub-genera.

73. SPECIES. EUSPONGAI COMPACTA. Carter.

EUSPONGIA COMPACTA. Carter (1).

SHAPE AND SIZE.

Thin, horizontal or vertical, extending concentrically from a pedunculated or contracted irregular base, terminating at the circumference in an irregularly fissured round margin. Consistence that ot very compact felt. Size, about 11 by 6 mm., in its longest diameter, and 2 mm., thick.

COLOUR.

Dark fawn when fresh, light fawn or grey after exposure when dry; dermal tissue colorless.

SURFACE.

Surface uniformly plain on both sides, interrupted only by the pedunculated attachment; minutely reticulated in relief from the subsidence of the dermal tissue upon the subjacent fibrous structure, which terminates in little conuli, each of which bears a sand thread, osculi numerous, small, circular, each provided with an annular diaphragm; disposed singly or in scattered groups on one side, more plentiful and more or less in juxtaposition on the other;

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(1) *H. J. Carter.* New Sponges, Observations on old ones, and a proposed new Group. Annals and Magazine of Natural History. 5th Series, Vol. X., No. 56, p. 106, 1882.

when single and isolated, presenting a stelliform arrangement of the superficial branchés of the exhalent canal system, but when on the margin, running in straight lines towards the latter. Pores in the interstices of a soft fibrous reticulation *in* the dermal tissue which tympanizes the interstices of the subdermal fibrous reticulation.

CANAL SYSTEM ?

SKELETON.

Internal structure composed of fine keratine fibre. densely reticulated ; traversed plentifully by the branches of the exhalent canal system.

GEOGRAPHICAL DISTRIBUTION.

East Coast of Australia, (T. Jukes.)

BATHYMETRICAL DISTRIBUTION ?

73. SPECIES. EUSPONGIA OFFICINALIS. F. E. Schulze.

Ditela nitens. O. Schmidt. (1)
Euspongia officinalis. Graeffe. (2)
Euspongia officinalis. Poléjaeff. (3)
Euspongia officinalis. Ridley. (4)
Euspongia officinalis. F. E. Schulze. (5)
Feiner Badeschwamm, Eckhel. (6)

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(1) *O. Schmidt.* Die Spongien des Adriatischen Meeres. Leipzig, 1862. Seite 24.

(2) *E. Graeffe.* Uebersicht der Seethierfauna des Golfes von Triest nebst Notizen über Vorkommen, Lebensweise, Erscheinungs und Fortpflanzungszeit der einzelnen Arten. Arbeiten aus dem zoologischen Institute der Universität Wien und der zoologischen Station in Triest. Bd. 7, Heft 2, 1882, p. 3.

(3) *N. Poléjaeff.* Report on the Keratosa. Report on the scientific results of the voyage of H.M.S. Challenger, during the years 1873-76. Zoology, Vol XI., part 31, 1885, p. 53.

(4) *Stuart O. Ridley.* Spongiida. Report on the zoological collections made in the Indo-Pacific Ocean during the voyage of H.M.S. Alert, 1881-2. British Museum of Natural History Catalogue, 1884, p. 379.

(5) *F. E. Schulze.* Untersuchungen über den Bau und die Entwickelung der Spongien. Siebente Mittheilung. Die Familie der Spongidæ. Zeitschrift für wissenschaftliche Zoologie. Bd. 32, Heft 4, 1879, p. 616.

(6) *Eckhel.* Der Badeschwamm. Triest, 1877.

Spongia adriatica. O. Schmidt. (7)
Spongia adriatica. O. Schmidt. (8)
Spongia agaricina. Ehlers. (9)
Spongia agaricina. Esper. (10)
Spongia agaricina. Pallas. (11)
Spongia discus. Duchassaing et Michelotti. (12)
Spongia graminæ. Hyatt. (13)
Spongia lapidescens. Duchassaing et Michelotti. (14)
Spongia lignea. Hyatt. (15)
Spongia mollissima. O. Schmidt. (16)
Spongia nitens. O. Schmidt. (17)
Spongia officinalis. Bowerbank. (18)
Spongia officinalis. Carter (19)

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(7) *O. Schmidt.* Die Spongien des Adriatischen Meeres. Leipzig, 1862, p. 20.

(8) *O. Schmidt.* Supplement der Spongien des Adriatischen Meeres, enthaltend die Histiologie und Systematische Ergänzungen. Leipzig, 1864, p. 24.

(9) *E. Ehlers.* Die Esperschen Spongien in der Zoologischen Sammlung der K. Universität Erlangen. Programm zum Eintritt in den Senat der Königlich Fridrich-Alexander Universität in Erlangen. Erlangen, 1870, p. 11.

(10) *E. T. C. Esper.* Die Pflanzenthiere. Theil II., p. 216, 1791-1830.

(11) *P. S. Pallas.* Elenchus zoophytorum. Hagæ Comit, 1766, 1768, p. 397.

(12) *P. Duchassaing de Foubressin et Giovanni Michelotti.* Spongiaires de la Mer Caraïbe. Memoire publié par la Société Hollandaise des Sciences á Harlem 1864, p. 37.

(13) *A. Hyatt.* Revision of the North American Porifera, with remarks upon foreign species. Part II. Memoirs of the Boston Society of Natural History, Vol. II., 1877, p. 46.

(14) *P. Duchassaing et Michelotti.* Spongiaires de la Mer Caraïbe. Memoire publié par Société Hollandaise des Sciences á Harlem 1864, p. 34.

(15) *A. Hyatt.* Revision of the North American Porifera, with remarks upon foreign species. Part II. Memoirs of the Boston Society of Natural History, Vol. II., 1877, p. 45.

(16) *O. Schmidt.* Die Spongien des Adriatischen Meeres Leipzig 1862, p. 23.

(17) *O. Schmidt.* Supplement der Spongien des Adriatischen Meeres, enthaltend die Histiologie und Systematische Ergänzungen. Leipzig, 1864, p. 27.

(18) *I. S. Bowerbank.* A Monograph of the British Spongiadæ, Vol. I., Roy. Society for 1864, p. 205.

(19) *H. J. Carter.* Some sponges from the West Indies and Acapulca in the Liverpool Free Museum, described with general and classificatory remarks. Annals and Magazine of Natural History. Series 5, Vol. IX., No. 52, p. 270, 1882.

Spongia officinalis. Ehlers. (20)
Spongia officinalis. Esper. (21)
Spongia officinalis. Hyatt. (22)
Spongia officinalis. Linné. (23)
Spongia officinalis. Pallas. (24)
Spongia quarnerensis. O. Schmidt. (25)
Spongia vermiculata. Duchassaing et Michelotti. (26)
Spongia virgultosa. O. Schmidt. (27)

Of the numerous varieties of this species, which are found in all parts of the world, two belong to the Australian fauna.

They are the following :—

I. EUSPONGIA OFFICINALIS DURA. V. Lendenfeld.

Identical with Spongia Lignea Dura. Hyatt (l.c.)

II. EUSPONGIA OFFICINALIS CAVERNOSA. Ridley.

Shape and Size.

It is a difficult thing to describe the shape of this species as it is so very variable.

Massive rounded, irregularly labose, lamellose. The different varieties differ also in their outer appearance.

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(20) *E. Ehlers.* Die Esperschen Spongien in der Zoologischen Sammlung der K. Universität Erlangen. Programm zum Eintritt in den Senat der Königlichen Fridrich-Alexander Universität in Erlangen, 1870, p. 12.

(21) *E. T. C. Esper.* Die Pflanzenthiere. Theil II., p. 218.

(22) *A. Hyatt.* Revision of the North American Porifera, with remarks upon foreign species. Part II. Memoirs of the Boston Society of Natural History, Vol. II., 1877, p. 41.

(23) *Linné.* Systema Naturæ.

(24) *P. S. Pallas.* Elenchus zoophytorum. Hagæ Comit, 1766, 1768, p. 87.

(25) *O. Schmidt.* Die Spongien des Adriatischen Meeres. Leipzig, 1862, p. 22.

(26) *P. Duchassaing et Michelotti.* Spongiaires de la Mer Caraïbe. Mémoire publié par la Société Hollandaise des Sciences á Harlem, 1864, p. 35.

(27) *O. Schmidt.* Die Spongien der Küste von Algier, mit Nachträgen zu den Spongien des Adriatischen Meeres (drittes Supplement) Leipzig, 1868, p. 4.

EUSPONGIA OFFICINALIS CAVERNOSA,

is bulbous, turnip-shaped (described by Ridley (l.c.), from a single dry specimen), with several tubular processes on its upper surface, 10-35 mm long, and 8-10 mm. in their greatest diameter. These processes however are ragged in outline at their distal ends and evidently in life opened through their fringed aperture, now obscured from the falling together of the sides. Their sides are in some cases fenestrate. The body of the sponge is rudely globular, and is drawn up above into monticular elevations, which are terminated by the tubes just described; the base is somewhat flattened and has been attached at more points than one. The horizontal diameters are 45 and 55 mm. The vertical height to base of uppermost tube is 30 mm.

From this description which is copied verbatim from Ridley (l.c.), it appears that this variety is most similar to my species Euspongia conifera. I will leave it however to Mr. Ridley to decide this, whether they are identical or not.

EUSPONGIA OFFICINALIS DURA,

Spongia lignea levis. Hyatt (l.c.)

I have but one dry specimen and also Hyatt's description, which is not accompanied by an illustration, is very meagre. The shape of this variety is irregularly massive, horizontally expanded, with indications of irregular conic elevations on the sides and upper surface. My specimen measures 140 x 160 x 80 mm.

RIGIDITY.

Some of the varieties of this species are exceedingly soft and elastic, to this peculiarity of them their utility must be ascribed.

The variety *Euspongia officinalis dura*, is as the name implies very hard. By the pressure of 1 kilogramme the specimen of which the dimensions have been given above is compressed only 2 mm.

COLOUR.

The colour of the varieties hitherto examined in the live state, varies according to F. E. Schulze (l.c.), from bright straw-yellow to rust-red and dirty dark brown. The skeletons have the colour of "burnt siena".

SURFACE.

The surface differs according to variety and locality, conuli are always present and scattered pretty regularly over the surface. No conuli are found in close proximity to the oscula (indication of an askeletous part as in *Euspongia canaliculata*, described above). The conuli attain a height of 1 mm., and are of a similar thickness at the base. In the fields between them, there is a very dense network in the interstices of which the pore-sieves are found. The pores are not numerous. The oscula are never raised and scattered irregularly or else situated in lines. (Compare F. E. Schulze's exhaustive description and his excellent figures, l.c.)

There are very few foreign bodies in the skin.

CANAL SYSTEM.

The skin is pretty thick and there are very slender canals, which lead from the inhalent pores into the subdermal cavities. The latter consist of irregular cylindrical and tangental canals which are not very wide, and separated by broad masses of tissue (F. E. Schulze, l.c., Tafel XXXVI., fig. 2).

The final ramifications of the inhalent canal system are narrow and give off comparative wide special canals to the ciliated chambers (F. E. Schulze, l.c., Tafel XXXVI., fig. 12.)

The chambers open direct into the exhalents or are connected with them by short and narrow special canals hardly wider than those which lead from the inhalents to the chamber pores.

The exhalents join to form oscular tubes in the usual manner.

In the variety *Euspongia officinalis cavernosa*, there are according to Ridley (l.c.), very extensive lacunæ. These are connected with the apertures at the summits of the tubes. As Ridley's specimen was dry it is difficult to ascertain whether these cavities are vestibule-lacunæ or Oscular tubes. I am inclined to consider them as the former, judging from their similarity with the homologous structures in *Euspongia irregularis* and *canaliculata* described above.

SKELETON.

The main fibres are straight and not very thick, they contain a greater or smaller amount of foreign bodies.

The connecting fibres form a regular network, as mentioned in the description of the sub-genus.

The meshes are regular and small. The average thickness of the fibres is according to F. E. Schultze (l.c., p. 635), 0·03-0·038 mm. It varies according to the varieties.

I. EUSPONGIA OFFICINALIS CAVERNOSA.

The skeleton consists of (1), stouter main fibres, which are approximately straight and parallel to each other, about 0·04-0·07 mm. apart, more or less vertical to the surface (I presume this a mistake, it ought to be 0·4-0·7 mm.) according to position. Thickness about 0·03-0·04 mm., and (2) of connecting fibres, similar to the main fibres, and more or less vertical to them, but often very obliquely placed, thickness about 0·013-0·03 mm.; distance apart, very variable from 0·14 upwards.

II. EUSPONGIA OFFICINALIS DURA.

The main fibres are very thick and pretty close together, being on an average 0·5 mm., apart and measuring 0·2 mm., in thickness. The main fibres of no other variety are so thick. They are completely filled with foreign bodies 80% sand grains averaging 0·05 mm., and foreign spicules. These are mostly short fragments. The surface of the main fibres is uneven. The knobs are not high.

The connecting fibres form a very regular network. The meshes average 0·33 mm., in width. The thickness of the fibres is 0·033 mm.

The excessive hardness of this variety is due to the exceptional thickness of the main fibres.

HISTOLOGY.

The histology of some of the Mediterranean varieties has been worked out in such a manner by F. E. Schulze (l.c.) that it would be necessary to translate them verbatim here. As however every one, who intends to study the sponges must *ipse facta* possess and read F. E. Schulze's works, it will suffice here simply to refer to the work of that author cited above.

GEOGRAPHICAL DISTRIBUTION.

Mediterranean, (compare particularly Eckhel's map); North Atlantic Ocean, (Eckhel, Hyatt and others); South Atlantic Ocean, (Ridley); North Pacific Ocean, (Carter and Hyatt); Indian Ocean, (Pallas).

IN THE AUSTRALIAN SEAS.

I. EUSPONGIA OFFICINALIS CAVERNOSA.

North Coast of Australia, Torres Straits. (Alert.)

II. EUSPONGIA OFFICINALIS DURA.

West Coast of Australia (Bailey); South Coast of Australia, Port Phillip (Hyatt).

BATHYMETRICAL DISTRIBUTION.

20-200 metres. in the Mediterranean (Eckhel).

I. EUSPONGIA OFFICINALIS CAVERNOSA.

19 metres.

II. EUSPONGIA OFFICINALIS DURA.

Shallow water.

76. SPECIES. EUSPONGIA BAILYI. Nova species.

SHAPE AND SIZE.

This sponge has the shape of a cup or goblet. This shape is very constant and characteristic. Sometimes there are two cups joined to each other. Generally, however, there is only a single one. The cup stands upright on the sea bottom to which it is attached by one or more points of the more or less expanded base. Sometimes the cup is high and narrow, twice as long as broad; sometimes it is broad and horizontally expanded, barely as high as broad.

The cup attains a height of 170 mm. and a breadth of 190 mm. It is in the specimen 170 mm. high, 105 mm. deep. Generally about two-thirds of the height of the sponge in depth. The lamella forming the cup thins out towards the margin very rapidly so that the margin, which always is very regularly circular, appears quite sharp.

SURFACE.

The outer surface is very rough and uneven. There are high irregularly longitudinal ridges, and also other outgrowths of varying shape. The skeleton presents a great irregularity of the outer surface. The inner side of the cup is very smooth, and the skeleton possesses on that side numerous round holes, averaging 3 mm. in diameter, which probably indicate the position of the oscula.

As only dry skeletons are at my disposal, I am not able to give a detailed description.

RIGIDITY.

The sponge is pretty soft and elastic. By the pressure of 1 kilogramm on the side of the cup it is depressed (large specimen) about 10 mm. Small pieces of the cup wall, of the size of a cubic centimetre can be compressed by the weight of 1 kilogramm to a thickness of 1 mm.

Colour.

In the live state unknown. The colour of the beach worn specimens is light brown.

Canal System.

The structure of the skeleton indicates that there are skeletous and askeletous portions, in as much, as rounded grooves are found in great abundance between the ridges of the outer surface.

Skeleton.

The main fibres are straight, on an average 0·7 mm., apart and extend from the base upward and outward, terminating always in the tags on the outer surface of the cup.

They measure 0·1 mm., in thickness and are smooth. *They do not contain any foreign bodies,* and their surface is accordingly quite smooth.

The connecting fibres form a very regular network, the meshes of which average 0·25 mm. Their thickness is 0·04 mm.

Nothing is known of the histology of this sponge.

Geographical Distribution.

West Coast of Australia, (Baily.)

Bathymetrical Distribution.

Shallow water ?

77. SPECIES. EUSPONGIA LEVIS. Nova species.

Shape and Size.

Euspongia levis is a lamellar species and resembles in outer appearance, to a certain extent, forms of the genus Antheroplax.

From a central mass, which is attached by a small portion of the base, numerous lobate lamellæ arise, which are straight or slightly curved and generally possess a serrate margin. The serrations are often so marked, that digitate processes are formed on the free margins of the curved lamellæ. These processes may be flattened or cylindrical, but they never reach a large size. The lamellæ enclose each other to a certain extent, so that a flower shaped form is produced.

The largest specimens measure 80 mm. in width and 60 mm., in height. The lamellæ have a very uniform thickness of 8-10 mm. The digitate processes may attain a length of 75 mm.

COLOUR.

The sponge is, alive and in spirits, of a brownish grey colour.

SURFACE.

The surface is perfectly smooth. There are no conuli. With a magnifying glass a very regular network of sand grains can be detected similar to the one which is described in this paper of *Euspongia canaliculata.*

In the meshes of this network we find the pore-sieves, which are slightly depressed and perforated by numerous small pores.

The oscula are disposed in an irregular line on the free margin of the lamella. A few are also met with on the broad sides. They measure about 1 mm., across, are circular, and slightly elevated above the surrounding surface. The oscula are numerous.

CANAL SYSTEM.

Below the outer skin a reticulation of anastomosing tangental canals are met with, which represent the subdermal cavity. The pore-sieves with their numerous pores cover the sub-dermal cavities in the shape of a thick skin, which is pervaded by numerous narrow canals as in *Euspongia silicata.*

The skin has a thickness of 0·22 whilst the pores and canals possess an average width of 0·03 mm. The pores can apparently be entirely closed by the sponge, although some of them are always seen open.

The greatest number observed in one pore-sieve was 16.

These canals are not very large, they measure on an average 0·2 mm. in diameter and are oval or irregular in transverse section.

They are not very numerous, and there is only one single layer of them. The firm substance between them is about as voluminous as the canal space.

Towards the centre of the lamella large exhalent lacunose canals are met with, which unite to form an oscular tube, tending upward and terminating with the circular osculum on the lamella margin.

Between these two canal-systems smaller canals, averaging 0·05 mm. in diameter are met with, these have mostly a circular transverse section and extend in a longitudinal direction. Some of them are exhalents, others inhalents. Between them th ciliated chambers, which are spherical and represent about three quarters of spheres, are met with. They measure 0·037 mm. i diameter.

SKELETON. (Plate 36, fig. 2.)

The skeleton resembles that of *Euspongia officinalis* prett closely. The main fibres are slightly branched and disposed long[illegible]tudinally. They are free from foreign bodies, and on an averag 0·1 mm. thick.

The connecting fibres form a very regular network. N secundary and tertiary fibres as in *Euspongia canaliculata* can b distinguished. All the connecting fibres are free from foreig bodies and 0·016—0.032 mm. thick. The most connecting fibre measure about 0·025 mm.

The meshes of the connecting fibre network are on an averag 0·1 mm. wide. They become smaller in the vicinity of the main fibres.

Here and there we find large sand grains measuring 0·2—0·4 mm. enclosed and embodied in the skeleton. These resemble the sand-grains forming an essential part of the skeleto of Aulena villosa, very closely. They are found occasionally in the network of the connecting fibres, but generally in the main fibres.

In the outer skin occasionally similar sand grains are met with, and there is no doubt that the sponge grows around these and so they become imbedded in it. Where the large sand grain has been attached near the termination of a main fibre it is simply taken up by it, this is the usual way in which the main fibres attain their core of foreign bodies. Between the main fibre terminations however, in the fields, we never find the foreign bodies in the surface being taken into the body of the sponge in other species of Euspongia. It appears that in this species the sponge selects from the numerous foreign bodies in its surface these large ones and allows them to be imbedded in its body, whereas all the other smaller ones present in abundance remain always in the outer skin.

GEOGRAPHICAL DISTRIBUTION.

East Coast of Australia, Port Jackson (von Lendenfeld, Ramsay); Broughton Island (Ramsay).

BATHYMETRICAL DISTRIBUTION.

5-10 metres (in Port Jackson).

The specimens from Broughton Island are larger than those from Port Jackson.

VI. SUB-GENUS. DENSALIS.

The species referrable to this genus are characterised by the small size of the meshes in the net-work formed by the connecting fibres, and the great thickness of them.

Whereas in the sub-genus Regularis the connecting fibres are about a tenth in thickness of the width of the meshes in the network, here they are only a sixth or less. The consequence of this is, that the skeleton becomes very dense.

78. SPECIES. EUSPONGIA PARVULA. Nova Species.

SHAPE AND SIZE.

Euspongia parvula is a very small and inconspicuous sponge.

It consists of conic or tapering digitate processes which grow out from a lamellose base attached by one side, The largest specimen measures 50 mm., in height and 30 mm., in width; the digitate processes reach a length of 25 mm., and are at the base 8 mm., wide. They are not regularly circular in transverse section but laterally compressed. Their ends are pointed.

Surface.

The surface is conulated, the conuli attain a height of 1 mm., and are 3 mm., apart.

There is very little sand in the skin. The fields are subdivided by a net-work of ridges as usual into secundary fields which contain the pore-sieves.

Rigidity.

The skeleton is soft and not very elastic. The digitate processes can be compressed to a tenth of their thickness by the weight of 1 kilogramm.

Colour.

The colour of the live sponge is dark bluish grey. This colour is retained in spirits.

The canal system does not present any peculiarities. It is similar to that of *Euspongia officinalis* in every respect.

Skeleton.

The straight main fibres measure 0·09 mm., in thickness. They are about 3 mm., apart. This is the reason why the sponge is so soft.

They are cored by sand grains which average 0·02 mm. The foreign bodies are scarce and scattered, the surface is smooth.

The connecting fibres measure 0·09 in thickness. They are as thick as the main fibres and the meshes average a width of 0·3 mm. They are rather irregular.

The specimens are not sufficiently preserved to enable me to give an account of the histology of this species.

Geographical Distribution.

Mauritius, (Von Haast.)

Bathymetrical Distribution.

Shallow water ?

79. SPECIES EUSPONGIA RETICULATA. Nova species.

SHAPE AND SIZE.

This species presents a very irregular appearance. It consists of irregularly curved and continually anastomosing digitate, and lamellose portions, which combine to form a perfect network.

The whole structure attains a size of 250 mm. in length and 100 mm. in height and width (the largest specimen.) The lamellose and digitate portions have an average thickness of 15 mm., while the interstices between them average a width of 20 mm.

The apertures, by which these large cavities open on the outer surface of the whole structure are irregular, and generally a little narrower than the internal cavities.

SURFACE.

The surface of the exposed portions, the outer surface appears conulated. The surface of the caverns in the interior is smooth. As I only possess skeletons of this species, a detailed description cannot be given.

RIGIDITY.

The skeleton of this sponge is hard and elastic. A large specimen is compressed by the weight of 1 kilogramm only about 5 mm. Small pieces are hardly compressed at all by that weight. Even the weight of 80 kilogramm only compresses the skeleton to half its size.

CANAL SYSTEM.

The cavities in the interior can be considered as vestibule spaces, but it appears as if these were secundary vestibules as also in the lamellæ themselves, we find indications of lacunæ and wide canals, which are very similar to the vestibule cavities in *Euspongia irregularis tenuis*, described above.

No indication of the position of the Oscula can be found in the skeleton, and also askeletous portions do not appear to exist. There are no grooves in the skeleton.

The canal system proper, must be composed of very fine canals as the skeleton appears very dense.

SKELETON. (Plate XXXVI., fig. 4.)

The main fibres are continuous from the base, apparently to the [illegible] extremities of the net structure of this sponge. This species in [illegible] every respect presents many peculiarities, which stamp it to [illegible] a transition form between the genera Euspongia and Hippospongia. Also the main fibre show in some places indications of a similarity with those of Hippospongia.

The main fibres are on an average 0·5 mm. apart, often however two or three extend for a long distance parallel and remain close together.

The fibres are completely filled with sand. The grains of this are small. The surface is roughened by numerous knobs, which often attain a height equal to half the diameter of the fibre.

The sand grains average 0·009 mm. The thickness of the main fibre is 0·038 at the thinnest, and 0·14 mm. at the thicker parts.

The connecting fibres form a network of meshes measuring on an overage 0·2 mm.. in width in the interior of the sponge. Here they are 0·05 mm., thick. The connecting fibres do not contain any foreign bodies.

On the surface another kind of network is met with. These meshes are narrower and the fibres thinner, and the whole structure is more irregular. This surface skeleton is however by no means always present and may be a pathological structure, caused locally to make its appearance where cammensols have taken up their abode.

Nothing is known of the histology of this species.

GEOGRAPHICAL DISTRIBUTION.

East Coast of Australia. Port Jackson, (Ramsay.)

BATHYMETRICAL DISTRIBUTION.

30-40 metres.

VII. SUB-GENUS. SILICIFIBRIS.

The skeleton of the species belonging to this sub-genus is similar in shape to that of the Regularis species. The main fibres are perforated where they are, as it is generally the case, slightly flattened.

The connecting fibres are of uniform thickness and form a pretty regular network.

The peculiarity of the sponges belonging to this sub-genus is, that they have a very great proclivity for foreign siliceous spicules, which are not only found in great abundance in the main fibres but also in the connecting fibres.

It will be remembered that in none of the other sub-genera, foreign bodies are found in the connecting fibres.

80. SPECIES. EUSPONGIA GALEA.

Nova Species.

Shape and Size.

This species presents the shape of a graceful cup. It is 250 mm. high and measures at the top 260 mm. in diameter. The margin of the cup is regularly circular. The cup is nearly cylindrical the base being nearly as broad as the top. It is perforated at the bottom. Also the sides are perforated here and there. The wall of the cup measures 100 mm. in thickness at the thickest part and becomes thinner towards the margin, which is sharp.

Surface.

The outer surface is rendered very uneven and irregular by the appearance of numerous longitudinal irregular and round ribs which extend over it. Only a skeleton is at my disposal. The inner side of the cup is not near so uneven as the outer. The skeleton indicates that there were askeletous portions, by the presence of smooth grooves.

Canal System.

The whole structure is excessively lacunose and light. The wall of the cup is pervaded in every direction by wide and anastomosing lacunæ, which indicate that this species possesses very highly developed vestibule cavities. No trace of oscula is visible.

Skeleton.

The main fibres are straight, and here and there flattened and perforated. They measure 0·07 mm. in thickness and are 1 mm. apart. Their surface is rough and even slightly spiny. They are cored with longitudinally disposed foreign siliceous spicules. 0·1 mm. on an average in length.

The connecting fibres form a net-work, the meshes of which average 0·2 mm. in width, the thickness of the connecting fibres is 0·06 mm. on an average. The connecting fibres only contain very few foreign spicules, much fewer than the connecting fibres of *Euspongia silicata.*

Geographical Distribution.

East Coast of Australia. (Ramsay.)

Bathymetrical Distribution.

Shallow water ?

79. SPECIES EUSPONGIA FOLIACEA. Ridley.

EUSPONGIA FOLIACEA. Ridley (1).
? SPONGIA FOLIACEA. Esper (2).
? PLATYCHALINA FOLIACEA. Ehlers (3).

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(1) *Stuart O. Ridley.* Spongida. Report on the Zoological Collections made in the Indo-Pacific Ocean during the Voyage of H.M.S. Alert, 1881-2. British Museum of Natural History, Catalogue 1884, p. 378.

(2) *E. T. C. Esper.* Die Pflanzenthiere. Theil I. Seite 201, 1791.

(3) *E. Ehlers.* Die Esperschen Spongien in der Zoologischen Sammlung der K. Universität Erlangen Programm zum Eintritt in den Senat der Königlich Fridrich-Alexander Universität in Erlangen. Erlangen 1870. Seite 21.

SHAPE AND SIZE.

Euspongia foliacea is a ceratose species, differing from the common species of Euspongia, only in its flattened form. There are numerous small pores scattered all over one side (the front) of the sponge. Size ?

COLOUR ?

SURFACE.

On the surface there are conic elevations. With the exception of a few fragments of spicules of different thickness, found singly and rarely in a few fibres, more numerous in the surface, there are no spicules at all. They seem to be foreign bodies taken in, in small quantities into the surface-tuft.

CANAL SYSTEM ?

SKELETON.

The fibres of the main skeleton agree in their consistency and non-rectangular arrangement with those of Euspongia, and as stated already, foreign bodies are the exception even in the surface tufts. The diameter of the fibres is ·4 to ·7 mm., except in delicate Ditela network of the surface and interstices, where it is only ·0085 to ·022 mm.

This description is hardly sufficient.

GEOGRAPHICAL DISTRIBUTION.

North Coast of Australia ; Torres' Straits, West Island ; (Alert.)

BATHYMETRICAL DISTRIBUTION ?

82. SPECIES. EUSPONGIA SILICATA. Nova Species.

SHAPE AND SIZE.

The specimens which I refer to this species are small, horizontally extended, lobed and vertically compressed. The largest specimen attains a size of 70 mm. in length, 40 mm. in breadth and 20 mm. in height. The thickness of the lamellose sponge rarely exceeds 14 mm.

SURFACE.

The surface of the sponge is perfectly smooth in the living state. There are, however, in hardened specimens, which always shrink a little; slight depressions in the fields between the terminations of the main fibres in the skin, which then, of course, appear as conuli. (Plate XXXVIII., fig. 1).

A few tangental connecting fibres radiate from the terminations of the main fibres and these support the skin in which they extend, they are not different from the fibres in the interior. There are only very few foreign bodies in the skin, so that the slightly raised ridges on the surface, which form the usual network dividing the pore-sieves from each other, do not appear like dense masses of sand, as in some of the species described above. The few foreign bodies are scattered irregularly over the surface, they are always tangentally disposed, foreign siliceous spicules often quite unbroken. (Plate XXXVIII., fig. 1.) In the pore-sieves there are a great many small pores. (Plate XXXVIII., fig. 3).

The oscula are small and numerous, scattered irregularly over the surface or also grouped in lines. They are circular and measure 1 mm. in diameter. They appear very slightly raised over the surface.

RIGIDITY.

This sponge is very hard and elastic. A lamella, 10 mm. in thickness and 400 ▭ mm. large is compressed, 3 mm. by the weight of one kilogramm.

COLOUR.

In the living state this species is of a greyish rose colour. In spirits it appears darker grey on the surface and lighter grey in the interior. The dry skeleton is light brown.

CANAL SYSTEM.

From the pores in the pore-sieve mentioned above, which measure, when dilated, 0·01 mm. in diameter, and which are circular, cylindrical canals lead down to the sub-dermal cavities. (Plate XXXVIII., fig. 2 *c*). There always are a great number of pores, as many as 30 in one pore-sieve. The canals which lead down from them extend tangentally and obliquely, and join to form larger canals which likewise extend tangentally. (Plate XXXVIII., fig. 1). These finally open into the sub-dermal cavity, which is formed by large tangental irregular canals, separated from the outer surface by a very thick skin 0·15 mm. in thickness. (Plate XXXVIII., fig. 2).

This part of the canal system is very similar to corresponding parts of the canal system in certain Gumminæ (1).

The sub-dermal cavities measure 0·14 mm., on an average in width, although there are here and there spaces 0·6 mm., wide.

From this net work of tangental canals which forms the sub-dermal cavity, canals extend obliquely downward which rapidly ramify in an irregular manner. These branches supply the sponge. Their size of course is very variable but they rarely exceed 0·2 mm., in diameter and mostly have a circular transverse section.

The ciliated chambers are attached to the final ramifications of these canals without the formation of any special canals leading to the chamber pores as in *Euspongia officinalis*. The chamber pores are also much smaller and apparently more numerous.

The small exhalents join to form large canals which are irregular and may attain a width of 0·7-0·9 mm. These join and form the oscular tubes which are generally vertical to the surface and straight, with a circular transverse section. They are about 1·2 mm. wide, and extend nearly right through the lamellose sponge. Into the sides and particularly into the lower portion of this oscular tube, these exhalent canals open.

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(1) *F. E. Schulze.* Untersuchungen über den Bau und die Entwicklung der Spongien. Dritte Mittheilung. Die Familie der Chondrosidæ. Zeitschrift für wissenschaftliche Zoologie. Band XXIX., Seite 87.

As mentioned above, the osculum is about 1 mm wide, so that the tube appears contracted towards tbe osculum.

SKELETON. (Plate XXXVIII., fig. 1.)

The skeleton consists of compressed main fibres and a very regular net work of connecting fibres of uniform diameter.

The main fibres are often expanded so as to appear flat, and then the margins of the flattened expansions are perforated by oval holes and in this way there is no abrupt distinction between main and connecting fibres as they are connected by this intermediate structure.

The thickness of the main fibres where it is not expanded, is 0·066 mm. The main fibres are on an average 0·6 mm. apart, and extend from the points of attachment of the sponge upwards and outwards. They are disposed in a radiating manner round these points to a certain extent.

They are however very irregular, and much bent and curved in various ways.

They are cored with foreign siliceous spicules averaging a length of 0·07-0·09 mm. These spicules are always broken, and it appears taken into the fibre without any discrimination. They protrude to a certain extent beyond the surface of the fibre, causing it to appear rough, or even spiny. The spicules are disposed mostly in a longitudinal direction occasionally very oblique however. Then one of their ends protrudes. This end is generally the more pointed one of the two. Some of the spines thus disposed point outward, towards the surface, others again inward towards the centre of the sponge. The spicules are also, where they protrude entirely enclosed by a sheath of horny substance. (Plate XXXVIII., fig. 1).

The connecting fibres form a regular net-work. The meshes average a diameter of 0·09 mm.

The thickness of the connecting fibres is 0·025 mm.

The connecting fibres contain in their axes similar foreign siliceous spicules as the main fibres (Plate XXXVIII., fig. 2) these are always disposed longitudinally.

HISTOLOGY.

The study of some well preserved specimens of this sponge has led to some interesting discoveries, which show that this species possesses some peculiarities in its structure hitherto not observed in other sponges.

GLAND CELLS.

In the skin between the canals, which lead down from the pores, amœboid cells are found, which present the usual shape, but appear more granular. Others again with a still more granular protoplasme are found attached to the ectoderm cells covering the outer surface and the inhalent canals.

There are all desirable transition forms from these amœboid wandering cells to true gland cells (Plate XXXVIII., fig. 2 *a*) attached by their thin end to the ectodermal epithelia. These are club-shaped and resemble those gland cells described by Méréjowsky (1) of Halisarca very closely. They differ from those described by me of Aplysillidæ (2) only in so far as they possess only a single process to connect them with the surface.

No nucleus is visible in these cells, which are completely filled with granules when fully developed.

The remarkable thing is, that these cells are found not only on the outer surface but all along the narrow inhalent canals.

It makes one the impression that some of the amæboid wandering cells are converted into these gland cells, wherever these gland cells may be required. The whole of the protoplasm of the amœboid cells seems to be converted into the slimy secretion, the granules.

It is further of interest to note that these gland cells are expelled from the sponge *in toto*, and that they then spread out on the outer surface where apparently they are converted into slime.

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(1) *C. Méréjkowsky*. Etudes sur les Esponges de la Mer Blanche. Mémoires de l'Académie Imperiale des Sciences de St. Pétersbourg, VII. Serie, No. 7.

(2) *R. von Lendenfeld*. Ueber Cœlenteraten der Südsee. II. Mittheilung. Neue Aplysinidæ. Zeitschrift für wissenschaftliche Zoologie. Band XXXVIII., Seite 268.

I have sections where the whole mass of granules representing one gland cells can be seen on their way out from the mesoderm, through the Ectodermal Epithelium. In other sections again the masses of granules are seen on the outer surface.

These cells accordingly secret the slime by being converted into it, like some of the cells in the milk glands of mammals. At the same time this accounts for my observation made some years ago (1) that the gland cells disappear after they have secreted slime for some time. They are regenerated as long as there are any amœboid wandering cells, but when there are no more of these the production of slime must cease.

It appears that these gland cells are being formed as an emergency occurs, and need not necessarily always be present. It would otherwise be surprising that F. E. Schulze and others did not see them.

SENSITIVE CELLS.

In the skin there are some isolated spindle-shaped cells, which I am inclined to consider as nervous elements. (Plate 38, fig. 2 *d.*) They are very slender and taper downward to a fine granular thread which can be traced for some distance. Remnants of a Palpocil. (Plate 38, fig 2 *e*), were observed several times.

Ganglia cells do not appear to be present.

GEOGRAPHICAL DISTRIBUTION.

East Coast of Australia, Port Jackson (Ramsay, von Lendenfeld); North Coast of Australia, Torres Straits, (Macleay); Northern Territory of South Australia, (Haacke.)

BATHYMETRICAL DISTRIBUTION.

40 metres, Port Jackson; shallow water?

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(1) *R. von Lendenfeld.* L.c.

EXPLANATION OF PLATES.

Note.—In all cases where no mention is made in the explanation of the method in which the plates were drawn, Zeiss's new reflecting camera has been employed, so that the relative dimensions are very reliable.

Plate 36.

Fig. 1.—*Euspongia canaliculata.* R. v. L. Var. *dura.*
Skeleton.
Distal part of a transverse section through the massive part of the sponge.
50:1 magnified.

Fig. 2.—*Euspongia levis.* R. v. L.
Skeleton.
Transverse section through the outer surface.
50:1 magnified.
Showing sand-grains in the skin (*a*), and large solitary sand-grains in the network of the clear horny threads (*b*), (*c*) are the spaces for the sub-dermal cavities.

Fig. 3.—*Euspongia irregularis.* R. v. L. Var. *Jacksonia.*
Skeleton.
Portion of the network formed by the connecting fibres.
50:1 magnified.

Fig. 4—*Euspongia reticulata.* R. v. L.
Skeleton.
Portion of the network formed by the connecting fibres.
50:1 magnified.

Fig. 5.—*Euspongia repens.* R. v. L.
Skeleton.
Portion of the network
Transverse section through the outer surface.
50:1 magnified.

Fig. 6.—*Euspongia Matthewsi.* R. v. L.
Skeleton.
Portion of the network.
50:1 magnified.

Plate 37.

Fig 1.—*Euspongia canaliculata.* R. v. L. Var. *elastica.*

Transverse section through the outer portion of one of the digitate processes.

Combined picture.

450:1 magnified.

(*P*) Pore-sieve. (*p*) Inhalent pores. (*a*) Askeletous portion of the sponge. (*s*) Skeletous portion of the sponge. (*M*) Radiating main fibre charged with sand, etc. (*S*) External sand armour in the outer skin in direct connection with the sandy core of the main fibre. (*V*) Connecting fibres free from foreign bodies. (*b*) Sharp pointed ends of the connecting fibres at the limit of the skeletous portion of the sponge (*c*) Axial thread in the connecting fibres. (*O*) Groups of ova. (*E*) Endothel cell-capsules, including the ova-groups. (*d*) Sub-dermal cavities belonging to the inhalent system. (*e*) Inhalent canals. (*f*) Exhalent canals. (*L*) Lacunæ of the exhalent system in the askeletous portion of the sponge. (*G*) Ciliated chambers. (*h*) Muscular membrane dividing the skeletous from the askeletous portion of the sponge, consisting of highly granular spindle-shaped cells. (*i*) Ganglion on the distal end of the muscular membrane. (*k*) Tangental nerves issued from the ganglion. (*l*) Sensitive cells in connection with the ganglion.

Plate 38.

Fig. 1.—*Euspongia silicata.* R. v. L.

Transverse section through the outer portion of the sponge.

Alcohol, Alum-carmin.

100:1 magnified.

(*a*) Primary inhalent canals. (*b*) Sub-dermal cavities. (*c*) Conuli. (*m*) Main fibres.

Fig. 2.—*Euspongia silicata.* R. v. L.

Transverse section through the outer skin.

Alocohol Alum-carmin.

1000:1 magnified.

(*a*) gland cells. (*b*) Inhalent pores. (*c*) Narrow, primary, inhalent canals leading from the pores into the sub-dermal cavity. (*d*) Sensitive cells. (The hypothetical palpocils (*e*) are not visible in the sections.) (*f*) Flat ectodermal cells. (*g*) Muscular and connective cells, spindle-shaped or multiplolar. (*h*) Amœboid wandering cells.

Fig. 3.—*Euspongia silicata.* R. v. L.
Portion of the skin seen from without.
Alcohol Alum-carmin.
135:1 magnified.
(*C*) Conuli. (*p*) Pores.

NOTES AND EXHIBITS.

Mr. Brazier exhibited a specimen of *Minyas*, n. sp., an Actinid of the N.W. Coast of Australia, from the Australian Museum.

The Rev. J. N. Manning exhibited a remarkably perfect fossil fish from the brick-yard of Mr. Abel Harver, St. Peter's, Cook's River. The rock in which this specimen is preserved is undoubtedly a portion of the Wianamatta Shales. It was regarded as a Ganoid by most members; but Mr. Ogilby maintained it to be of Cyprinoid affinities.

Mr. Macleay exhibited a male and female specimen of *Phalacrognathus Muelleri*, the insect described in his paper; also a male and female specimen of *Necrodes osculans*, an insect described by Vigors in 1825 as an inhabitant of India, but which has lately been found in Queensland and New Guinea. Mr. Macleay also exhibited a specimen of petrified wood from Mr. W. R. Campbell's Trigamon Station, Gwydir District, which appeared to be identical with the existing Myall tree.

Mr. Sidney Olliff exhibited some of the insects mentioned in his Paper—one a *Rhysodes*, a genus entirely new to Australia.

Dr. von Lendenfeld exhibited two photographs of Glacier-polished Rocks in the Mount Lofty Group, near Adelaide. They are Siluro-Devonian and show the striæ well. They are the same to which reference was made at a recent Meeting of the Society.

E. P. Ramsay, Curator of the Musuem, exhibited large specimnes of *Boltenia australis*, which had been secured through the kindness of Capt. Hixon, R.N. They were a portion of a mass of about a ton weight, found growing on the chain of a buoy placed off Dobroyde Point on the 9th of July 1884, and taken up on September 30, 1885. The largest specimen measured 3½ inches by 4 inches, the stalk 10½ inches in length, the color is of a rich orange red.

The Hon. James Norton, M.L.C., exhibited specimens of a Weeping Eucalyptus (Ironbark) with deep rose coloured flowers and branches of apparently the same species with white flowers—both varieties are from Canley Vale.

The President drew attention to the report upon Tasmanian Fisheries recently presented to Parliament by Mr. W. Saville-Kent, F.L.S., F.Z.S., in which it is stated that the true Salmon, *S. salar*, had not as yet been established in the island, that it is probable that none of the ova imported in 1864 arrived at maturity, and that the large fish which have been reputed to be Salmon are in reality Brown Trout (*Salmo fario*), "corresponding in all essential points with that variety known in England as the Great Lake Trout, or *Salmo fario*, var., *ferox* or *lacustris.*"

Considerable discussion followed, in which much hesitation was expressed as to the absolute determination of the points here mentioned, Mr. Ogilby declaring that the *Salmo fario* and all its forms (*S. trutta*, *S. levenensis*, *S. ferox*, *S. gallivensis*, *&c.*), differ only in consequence of variation in diet, time of breeding, depth of water, &c.

WEDNESDAY, 28TH OCTOBER, 1885.

C. S. Wilkinson, Esq., F.L.S., Vice-President, in the Chair.

MEMBER ELECTED.

Mr. Bond, Macquarie Place.

DONATIONS.

"Micro-Chemical Observations on the Blood in Health and in Typhoid Fever." By Thomas Shearman Ralph, M.R.C.S. From the Author.

"New Zealand Journal of Science." Vol. II, No. 11, September 1885. From the Editor.

"Proceedings of the Royal Society (London)." Vol. XXXVII, Nos. 232-237, May 1884, April 1885. From the Society.

"Bulletins de l'Academie Royale des Sciences, des Lettres et des beaux-arts de Belgique." 52 me., Année, 3 me., Série, Tomes VI, VII, and VIII. "Annuaires." 1884 and 1885. From l'Academie.

"Jours de solitude." Par O. Permez. From the Author (according to testamentary disposition).

"Jahreshefte des Vereins für vaterlandische Naturkunde in Wurttemberg." 1884. From the Society.

"Mémoires de la Société Royale des Sciences de Liége." Tome XII, 1884. From the Society.

"Annales de la Société Entomologique de Belgique." Tomes XXVIII. and XXIX., 1884, 1885. From the Society.

"Bijdragen Tot de Dierkunde." Vol. XII., No. 5. From La Société Royale de Zoologie, Amsterdam.

"Transactions of the Entomological Society of London." Part 2, 1885. From the Society.

"The Canadian Record of Science." Vol. I., No. 3, 1885. From the Natural History Society of Montreal.

"Memoirs of the California Academy of Sciences." Vol. I, Parts 1. and 2. "Proceedings." Vols. I, II, IV, V, VI, VII, Part I. "Catalogue of Pacific Coast Fungi." From the Academy.

"Journal of the New York Microscopical Society." Vol. I., Nos. 6 and 7, June and July, 1885. From the Society.

"Journal of Conchology." Vol. IV., No. 11, 1885. From the Conchological Society of Great Britain and Ireland.

"Synonymy and Remarks upon the specific names and authorities of four species of Australian Marine Shells, originally described by Dr. Gray, in 1825 and 1827." By John Brazier, Esq., C.M.Z.S. From the Author.

"Victorian Naturalist." Vol. II., No. 6, October 1885. From the Field Naturalists' Club of Victoria.

"Feuille des Jeunes Naturalistes." No. 179. From the Editor.

"Zoologischer Anzeiger." VIII. Jahrg., Nos. 203 and 204. From the Editor.

"The Provincial Medical Journal." Vol. IV., No. 44, August 1885. From the Editor.

"Journal of the Royal Microscopical Society, London." Ser. II, Vol. V, Part 4. From the Society.

"The British and Colonial Druggist." July, 1885. From the Editor.

"Proceedings of the Zoological Society of London." Part 2, 1885. From the Society.

"Comptes Rendus des Séances de l' Academie des Sciences." France. Tome CI., No. 7, 1885. From the Academy.

"Mémoires de la Société Nationale des Sciences naturelles et mathématiques de Cherbourg." Tome XXIV, 1884. From the Society.

"Tidschrift voor Entomologie." Vol. XXVIII., Parts 1 and 2. From the Entomological Society of the Netherlands.

PAPERS READ.

STUDIES ON SPONGES.

(PLATES 39-44.)

BY R. VON LENDENFELD, PH.D.

I.—THE VESTIBULE OF DENDRILLA CAVERNOSA. Nova Species.

Among the Australian Sponges which belong to the genus Dendrilla, there is one which is remarkable for the peculiar laxity of its structure. The sponge is digitate and of a dull yellowish colour. The skeletal fibres are dark brown to black. The sponge does not change its colour like some related species when exposed to the air. It attains a height of 400 mm., and the very irregular digitate processes average a width of 25 mm. The conuli on the outer surface are irregular, distant (average 8 mm.), and 2 mm.-4 mm. high.

Oscula are scattered over the surface. They are found on the sides of the digitate processes, but never appear situated terminally. The oscula are circular, 3 mm. in diameter.

The whole sponge appears, as mentioned above, to be entirely hollow. A large cylindrical cavity takes up the whole interior of each digitate process. The processes themselves hereby attain a tubular appearance.

Below, in the central, irregular mass from which the processes grow out, the cylindrical cavities of the digitate processes join (fig. 1), to form an extensive cavity traversed here and there by bridges of tissue. This whole cavity is a pseudogaster, no oscula are found in its surface; it is a vestibule belonging to the inhalent system.

Inhalent pores covered with the usual sieves are found throughout the surface of the Pseudogaster. These are perfectly similar to the inhalent pores on the outer exposed surface of the sponge.

These extensive lacunæ are not in direct communication with the outer world, we find moreover, at the distal terminations of the tubes in the digitate processes very fine and perforated membranes (fig. 1), dividing them from the water without.

It is easy to observe these membranes, which occasionally attain a size of 200 square millemeters, and we find that the pores in them may be so wide open that bridges as wide only as the pores themselvs are left between them. In other cases again the pores are found to be entirely closed, and every intermediate stage in the dilatation of the pores can be observed.

Two adjacent pores are always dilated nearly to the same width. It is never observed that one pore is nearly closed and the next one wide open. Generally we find the pores in these membranes on the terminations of some of the processes wide open, those in others nearly or completely closed. Occasionally I have also observed that the pores at one end of one and the same membrane are dilated much more than at the other. This however, is rare. If the sponge is killed rapidly by immersion in very strong spirits then the pores remain open. If however the sponge dies slowly by exposure to the air, or if it is placed in weak spirits then the pores are generally found closed.

There can be no doubt that the width of these pores is subject to very great variations, and that by means of these the current of water in the lacunæ can be regulated by the sponge.

The physiological value of these vestibule cavities divided from the outer water by membranes, with small pores, which can be dilated and contracted is not quite clear. At the breeding time of the sponge, from September to December (or longer), these cavities contain the embryos which swarm about in them in great numbers. Then they appear as breeding cavities. The mother sponge can let them out or keep them in, according to weather, the pores in the membranes are dilated or contracted. When the water outside is bad, it can be kept from the embryos by closing the pores, and in every way the whole cavity appears as an excellent nursery. It is, however, not often that one finds this cavity filled with embryos, generally there are no larvæ at all in it, and it seems that they are kept there for a short time only.

I am not inclined to believe that these cavities were originally produced to serve as a nursery, but we could easily understand how, after pseudoscula once had been formed by a process of secundary folding as in Halme and other sponges; (1) these had been turned into a nursery, and how a poresieve, similar to the structures covering the entrances of the inhalent system had been formed over it, so as to adopt it better to its new function.

But even if we attach less value to the breeding functions of this cavity, we still find that the formation of such a membrane was of great importance to the sponge, because it could by its means regulate the water current to a great extent.

Vestibule cavities belonging to the inhalent system and similar to those of our sponge have been described by me from Euspongia canaliculata (l. c.) These have no covering membrane, In several siliceous sponges belonging to the genus Syphonocholina I have found similar perforated membranes which are homologous to the membranes described above.

HISTOLOGICAL STRUCTURE.

I have examined the vestibule membrane, as I shall in future designate the structure here described, very minutely, and the results of a study of section series and surface views, are the following:—

Seen from the surface under a low power the membrane appears perforated by numerous circular holes which are distributed very regularly. (Fig. 2.) Their diameter is, as mentioned above, of course subject to very great variations. Their centres are on an average 0·4 mm. apart. When fully dilated they reach a width of 0·2 mm. After staining every pore appears surrounded by a dark ring. (Fig. 2.) More highly magnified (fig. 3) this ring dissolves itself into a number of irregular roundish and multipular cells which are situated a little distance away from the free margin. Between the margin and these cells granular threads, vertical to the contour of the margin are found, some of these contain a highly stained slightly elongate nucleus. The nuclei of the cells which form the ring, always are spherical.

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(1) *R. von Lendenfeld.* A Monograph of the Australian sponges, Part VI. Proceedings of the Linnean Society of N.S.W., Vol. X.

Behind the cells of the ring, spindle-shaped muscular fibres are found in abundance. They extend tangentally and often a number of them combine to form a regular bundle of parallel fibres.

Tranverse sections (figs. 4, 5) enable us to attain a clearer insight into these structures. The membrane has a thickness of 0·1 mm. The pores (fig. 4) are not cylindrical but conic holes. The diameter of the pore decreases towards the interior, and it is the lower side where the pores are closed when the muscular fibres in the membrane contract.

The whole of the membrane is covered by very low and flat epithelium cells. (Fig. 5.) These are doubtlessly ectodermal. The interior of the membrane is occupied by a gelatinous ground substance, in which cells of various kind are imbedded.

Just below the surface gland cells are met with. These are present in great numbers on both sides of the lamella. They are similar to the homologous elements in other species of Aplysillidæ described by me (1), contain a large spherical nucleus in their bulbous proximal portion, which is connected with the surface by a number of slender processes (fig. 5). These are simple or slightly ramified and always vertical to the surface. On the internal margin of the pore such gland cells are not met with. Here a different kind of cell is found below the ectodermal epithelium. These cells are slender and spindle-shaped and form a ring round the pore. In their shape they resemble those elements of other sponges and higher cœlenterates very closely which are considered as sensitive elements. The nucleus is different from the nucleus of the gland cell. It is oval and slightly smaller, 0·0038 mm. long and 0·003 mm. broad. The slender distal portion of the cell seems to project slightly beyond the surface. (Fig. 5.) In the centre the cell is barely thicker than the nucleus. Proximally it extends to form a process in the shape of a very fine granular thread. This becomes more and more indistinct the further we follow it down. I have, however, traced it to a distance of 0·03 mm. from the nucleus.

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(1) *R. von Lendenfeld.* Ueber Cœlenteraten der Südsee II., Mittheilung. Neue Aplysinidæ. Zeitschrift für wissenschaftliche Zoologie. Band XXXVIII.

In the parts of the membrane, distant from the pores, amæboid wandering cells (fig. 5 *a*), and tangental muscular cells are found (fig. 5 *m*.) The latter extend in every direction and are always spindle-shaped.

The greatest interest attaches to the cells (fig. 5 *g*), which constitute the ring visible already with a low magnifying power.

The nuclei of these cells are regularly spherical and larger than the nuclei of the amœboid wandering cells measuring 0·004 mm., in diameter. The body of the cell is irregularly bulbous and extends in the shape of fine processes in every direction. It appears that some of these processes connect these cells with the spindle-shaped sensitive cells described above, they appear as nerve fibres. The cells themselves are situated very close together and their processes often touch. I consider them as ganglia cells, and the whole structure as a circular nerve or ganglion surrounding the pore.

Although the nuclei become very clearly visible after staining the protoplasmatic body of the cell always remains more or less indistinct, so that particularly the processes and outlines of the ganglia cells cannot be described with great accuracy.

It appears that changes in the water are perceived by the sensitive and ganglia cells round the pores, and that the latter under circumstances incite the muscular cells in the membrane to contract, whereby the diameter of the pore may be changed.

II.—RAPHYRUS HIXONII.

A NEW GIGANTIC SPONGE FROM PORT JACKSON.

In 1862 Oscar Schmidt described two sponges (1) as Papillina suberea and nigricans from the Mediterranean. In 1866 Bowerbank (2) described a sponge as Raphyrus griffithsii which has also been figured (3.) Oscar Schmidt (4), afterwards combined this Raphyrus of Bowerbank with his own Papillina suberea, an arrangement which has been also adopted by Norman. (5)

According to this the genera Raphyrus (Bowerbank), and Papillina (O. Schmidt), would appear identical. Among the Australian Sponges there are forms which doubtlessly belong to the genus Papillina (O. Schmidt), whereas others again appear very different from these and coincide with Bowerbank's Raphyrus. All however, contain besides the *bulb ac,* the pin-shaped spicules, also *tr. tr. sp.* I assume that these also occur in the European species, but escaped the observation of Bowerbank and O. Schmidt. I think that both these genera should be retained. In Papillina the internal cavities are irregular and large, in Raphyrus they are very similar to the cells of a honeycomb, smaller and very regular.

The species to be described below, belongs to the latter genus, it is fairly abundant in Port Jackson. Numerous specimens measuring 20 x 30 C. m., have been dredged, their shape was bulbous and irregular; recently a specimen of unusual dimensions was brought up with the dredge. It is the largest Australian Sponge hitherto observed by me.

It is named after Captain Hixon, the President of the Marine Board.

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(1) *O. Schmidt,* die Spongien des Adriatischen. Meers 1862. Seite 69.

(2) *J. Bowerbank.* Monograph of the British Sponges. (Ray. Society.) Vol. II., p. 354.

(3) *J. Bowerbank.* Monograph of the British Sponges. (Ray. Society.) Vol. III., pl. LXIV.

(4) *O. Schmidt.* Grundzüge einer Spongienfauna des Atlantischen Gebietes, 1870. Seite 77.

(5) *A. M. Norman.* Monograph of the British Sponges, by the late J. S. Bowerbank. Ray. Society.) Vol. IV. Supplementary, p. 182.

RAPHYRUS HIXONII. Nov. spec.

SHAPE AND SIZE.

The smaller specimens are irregular, bulbous, with several vents on the upper convex surface. The large specimen (fig. 6), is massive, expanded above and was attached to the sand of the sea bottom by a flat expanded base, measuring 300 mm. across. It extends above very much. The upper surface is uneven, and horizontal (fig. 6.) Seen from above the out-line appears very irregular with lobate projections beyond a circular circumference. The sponge measures about 600 mm. in width, and 350 mm. in height. There are massive semi-spherical projections over the sides and upper surface. The latter are particularly regular and well-defined These protruberances extend 50 mm. over the depressions between them and are 120 mm. wide. In the large specimen there are nine such protruberances on the upper side. In the centre of each a vent is situated. In the smaller specimens these vents are scattered over the smooth and uniform surface of the convex upper side. In the large specimen they are found in the centres of the upper protruberances.

These vents are not Oscula but only Pseudoscula. They lead into short conic tubes, pseudogasters.

In the large specimen (fig. 6), there are according to the above, nine such Pseudoscular tubes 260 mm. long and at the mouth 30 mm. wide. They are straight, but not regularly conic as occasionally there are extensions half-way down, whereby their diameter may be locally increased to 50 mm. All these tubes are vertical and open on the upper, laterally expanded surface (fig. 6), on the summits of the protruberances.

The sponge weighed when fresh, about 200 kilogramm. Now that it has been dried, it weighs about 14 kilogramm.

RIGIDITY.

Alive in spirits and dry, the sponge is very hard, a pressure of 70 kilogramm in no way affects a surface of 50 □ C. m.

COLOUR.

The colour in the living state is a very bright red, similar to Rosanilin-red. In spirits the sponge becomes pale flesh-coloured, and dried it appears brown. The spirits extract a deep orange-coloured pignut, very similar to that extracted by spirits from many other Monactinellidæ.

SURFACE.

The surface is reticulated throughout in a very regular and uniform manner, and appears thereby similar to Bowerbank's Raphyrus Griffithsi, and also to some species of Halme among horny sponges. Young and old specimens always show the same reticulation on the surface, there seem never to be Papillæ in the place of the meshes, as it is the case in young specimens of the genus Papillina (O. Schmidt), which, according to that author, is identical with Raphyrus. As stated above, however, I consider these genera distinct.

The reticulation is produced by a very regular network of projecting lines on an average 2 mm. wide. In the meshes between these there are slight depressions, about 4-5 mm. deep. The meshes themselves have a width of 3-4 mm. The membrane which is thus expanded below the surface in the meshes is very soft, whereas the projecting lines are exceedingly hard. This membrane is also slightly concave. In it we find very small pores in groups, which are the commencement of the inhalent system.

This network covers the whole of the surface of the sponge and extends downwards into the conic pseudoscular tubes to their bottom.

Oscula are found scattered irregularly over the whole of the surface; they are circular and measure from 2-10 mm. in diameter. These oscula are as frequent on the exposed parts of the sponge as in the sides of the conic pseudoscula.

CANAL SYSTEM.

The whole sponge consists like the Auleninæ described in Part V. of the Monagraph of Australian Sponges in the last number of the proceedings of this Society, of a reticulate structure in its interior. (Fig. 8.) Lamellous fibres, with an average thickness of 1 mm. form a network, which on any section appears very regular. These fibres consist of a very hard tissue, with few and small canals and a great abundance of spicules. In the meshes between them (fig. 8) there is a very much softer tissue with wider canals or irregular lacunes. Here only few and insignificant spicules are found.

Below the poresieves in the concave membranes which extend in the meshes of the surface-network, large irregular cavities (fig. 16) are met with. The pores are situated, as stated above, in small groups. The sieve membrane is very thin and delicate. The pores can apparently be entirely closed by the sponge. The subdermal cavity extends far down and gives off branches which ramify to supply the ciliated chambers or extend to form lacunæ in other meshes of the interior of the sponge. Most of the lacunæ found throughout the interior of the Sponge belong to the inhalent system. Some of the final ramifications of the inhalent system are met with in the fibres of the internal network.

The ciliated chambers are small and difficult to see, they are spherical and measure 0·02 mm. in diameter; from the chambers very narrow canals originate and unite to form larger exhalent canals. The chambers seem to be situated in groups. Such groups occur only in the tissue of the hard fibres, as also in the soft pulpa which occupies the meshes.

The exhalent canals do not form extensive lacunæ at all. The larger branches and stems are found only in the soft tissue of the meshes. The oscular tubes follow the net-work in their lower part, and are therefore much curved. They are narrow and long and ramify in an irregular manner.

SKELETON.

The skeleton consists of the *bulb ac.* and *tr. ac.* spicules already described by Bowerbank and O. Schmidt of their genera Raphyrus and Papillina, to which two other kinds of spicules, observed in our species, must be added.

SURFACE SKELETON.

The surface of the hard projecting ridges in the surface net is occupied by a number of small spicules, which form a layer about 0·06 mm. thick. (Fig. 16.) These spicules (figs. 13, 14) are very variable in their shape, straight or curved, with large and irregular spines all over the surface and particularly at the ends. They could be termed *tr. tr. sp.* They are of very uniform size and measure 0·03 mm. in length and 0·007 mm. in thickness. Besides forming a dense armour on the projecting ridges they are found scattered also in the concave membranes of the meshes.

SKELETON OF THE HARD FIBRES.

The main support of the whole sponge is constituted by a reticulate mass of truncate and bulbous spicules, which are mostly situated longitudinally, and disposed in such a manner as to point towards the free surface (fig. 16) in the projecting ridges, or towards the pulpa in the meshes in the interior.

These spicules are not cemented together by any horny substance. They are very abundant, and form hard, dense masses (fig. 16) throughout the fibres of the interior. Scattered, these spicules are also found rarely in the soft pulpa of the meshes in the interior. These spicules are of uniform size 0·5 mm. long and 0·02 mm. thick. They are cylindrical and abruptly pointed (fig. 9.) The bulb of the majority of spicules measures 0·03 mm. in diameter. Sometimes it increases to a diameter of 0·0036 mm., and may have indications of points at its greatest diameter (fig. 10.)

One of these points may grow out to form a spine 0·09 mm. long (fig. 11.) This however, is rare.

On the other hand the bulb may be absent altogether. *Tr. ac.* spicules are not unfrequent.

SKELETON OF THE PULPA.

The soft tissue in the meshes contains besides scattered spicules of both the preceding kinds, also small clusters of very slender and gracefully curved *ac. ac. sp.* (fig. 15.) The clusters of these are found scattered irregularly throughout the soft tissue, and comprise from 7 to 12 spicules crossing each other in a perfectly irregular manner (fig. 16.)

These spicules attain a length of 0·2 mm., and a thickness of 0·003 mm. They bear short and sharp spines (fig. 15.)

HISTOLOGY.

In the soft tissue of the internal meshes, extraordinary granular cells are met with in great abundance (fig 17.) These are highly colourable and probably homologous to those elements, which I have described of Aphrodite Nardorus. (1) There we find likewise a great number of similar cells of a very peculiar appearance in the walls of the lacunes which belong to the inhalent system.

The shape of these elements in Raphyrus Hixonii, is subject to very great variations. The cells are spherical, about 90% of them, or irregularly lobate, 2%; or spindle-shaped, 6%; or also show indications of dividing as represented in the figure, 2% (fig. 17.) A nucleus is indicated by a more transparent patch in the centre, but not clearly visible. In coloured specimens the whole cell, or rather the granules take up so much colouring matter, that the whole structure is rendered intransparent. The reason that the nucleus in the fresh state and in spirit specimens appears light and transparent, is that the substance of the nucleus is free from granules.

The granules are large and refract the light very strongly. The differences in shape between these cells, lead me to assume that they are a peculiar kind of amœboid wandering cell.

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(1) *R. v. Lendenfeld.* A Monograph of the Australian Sponges. Part V. The Auleninæ. Proceedings of the Linnean Society of N. S. W. Vol. X., part 3.

I further assume that in this case, as also in Aphrodite, these cells are in connection with the digestive functions of the sponge, and take up and absorb microscopic food-particles, which may get into the lacunæ of the inhalent system, and there come in contact with the epithelium.

GEOGRAPHICAL DISTRIBUTION.

East Coast of Australia, Port Jackson (Ramsay.)

BATHYMETRICAL DISTRIBUTION.

40 metres.

The type specimens of this sponge are in the Australian Museum, Sydney.

III.—HALME TINGENS.

A SPONGE WITH REMARKABLE COLOURING POWER.

Among the sponges sent by Dr. Haacke from Thursday Island, is a new species of my genus Halme.

HALME TINGENS. Nov. spec.

Sponge composed of reticulate lamella, massive 200 x 300 x 100 mm. large. No dermal lamella. Meshes on an average 12 mm. wide. Lamella curved 2-3 mm. thick, covered with small conuli. Very little sand in the skin. Skeleton composed of very distant fine fibres. Radial main fibres charged with foreign bodies and tangental connecting fibres free from such. Colour in spirits at first white, then violet.

The spirit extracts a yellow colour from the sponge, which appears to remain in solution in the spirits. This sponge was dredged by Dr. Haacke at Thursday Island.

It is an intermediate form connecting the sub-family Auleninæ with the genus Hippospongia.

Halme tingens is very peculiar inasmuch as it colours paper and other substances with a dark violet tint. If paper is inserted in a bottle containing this sponge and spirits, it will be found that the paper, after a day or two, is stained a deep violet blue. A colour which will not disappear when the paper is washed with water or ether. Concentrated acids and strong alkalis affect the colour. Acids make it red like litmus. Alkalis turn the red colour blue again.

I do not know anything about the chemical nature of the colour. It is very remarkable that the spirits are only stained light yellow by the sponge. It appears that the colour is precipitated on the paper, &c., after it has been extracted from the sponge by the spirits.

It appears that a great quantity of paper, &c., can be stained by a very small piece of the sponge, and I think that possibly this discovery might be turned to practical account for the purpose of dyeing blue-violet.

IV. TWO CASES OF MIMICRY IN SPONGES.

In the cases in question two species of horny sponges imitate two species of Siliceous sponges. As both the two imitating and also the two imitated sponges are new species, it will be necessary to give a short description of them first.

GENUS. CHALINOPSIS.

Sponges which belong to the family Spongidæ, sub-family Chalinopsinæ which imitate the shape of Chalinidæ, more or less closely, and which have a light and tender skeleton composed of radial main and tangental connecting fibres without conuli and without vestibule spaces. The skeleton is more or less grey in the dry state. Sponges of digitate shape.

CHALINOPSIS IMITANS. Nova species.

Digitate processes regular smooth and cylindrical, very long and slender, slightly branched. Oscula very small. Digitate processes tapering to a more or less sharp point. The sponge is attached by a short thick stem.

Thickness of digitate processes 8 mm., length 600 mm. The whole sponge hard and elastic.

Locality : East Coast of Australia, Illawarra.

This species is represented in fig. 19.

CHALINOPSIS DICHOTOMA. Nov spec.

Digitate processes cylindrical of not very uniform diameter, repeatedly branched in a dichotomous manner. The whole sponge attached by a thin stem.

Oscula large and very numerous. Digitate processes 12 mm. thick, tending to extend in one plain, particularly at the points of ramification. Irregular digitate and conic processes on the surface. Sponge 400 mm. long.

Locality : West Coast of Australia, Western Australia.

This sponge is represented in fig. 21.

GENUS. DACTYLOCHALINA.

Sponges belonging to the Monactinellæ. Skeleton composed o a hexactinellid network of horny fibres. Meshes pretty small. An extremely fine network of slender threads with very small meshes on the surface.

Very small and slender spicules *ac. ac.* straight or slightly curved are found in the axis of the horny fibres. These spicules are not numerous. They are more scarce in the connecting than in the main fibres. They are found also in the fibres of the fine surface-net.

Sponges with digitate processes.

DACTYLOCHALINA CYLINDRICA. Nov spec.

Digitate processes nearly straight, slightly branched, growing in a penicillate manner parallel from the expanding branches at the base. They coalesce here and there, where they accidentally touch. They are slightly undulating, regularly cylindrical and 7 mm. thick. They terminate with rounded ends. Oscula small, common stem short and thick. Length of sponge 500 mm.

Locality : East Coast of Australia, Port Jackson.

This sponge is represented in fig. 20.

DACTYLOCHALINA RETICULATA. Nov. spec.

Digitate processes irregular, repeatedly branched and anastomosing, 12 mm. thick, more or less cylindrical, with an uneven surface, and much curved. Tapering at the tips to a pointed terminus. Length of the sponge 200 mm.. Oscula large, scattered over the surface.

Locality : East Coast of Australia, Port Jackson.

This sponge is represented in fig. 22.

When working out the sponges I was so deluded by the external similarity of these sponges, as actually to put Chalinopsis imitans and Dactylochalina cylindrica, and also Chalinopsis dichotoma and Dactylochalina reticulata specimens together. Only afterwards I ascertained by examining sections of different specimens under the microscope, that I had confounded sponges belonging to two different orders with one another.

All the representatives of my sub-family Chalinopsinæ of the family Spongidæ, are more or less similar to species of Chalinidæ-Monactinellid sponges. The most striking similarity however, is shown by the four species described above.

The similarity could be accounted for in various ways. We might assume that the Chalinopsidæ where the links connecting the Ceraospongia with the Monactinellidæ. In this case we would have to assume that either the horny sponges have descended from the silicious, and that the Chalinopsinæ were horny sponges which had been just produced by the loss of the silicious spicules in the fibres of the similar Chalinidæ, or that *vice versa* the Chalinidæ are descended from horny sponges, and that these forms are the ones just commencing to obtain spicules. We might also assume that these sponges were not at all related with each other.

I have some years ago advocated the view, that silicious sponges descended from horny ones, the evidence however, which has since then been brought forward seems to indicate that the silicious sponges are the ancestors of the horny ones, a view advocated by Vosmær and Poléjaeff.

I think that the Chalinopsinæ are very nearly allied to the Chalinidæ, but I do not think that they are so nearly related to each other as the similarity of their outer appearance would indicate. It seems most probable that the two species of Chalinopsis described above are descendants of digitate Chalinidæ, they have lost the defensive spicules which are no doubt of great value to Dactylochalina, but they have retained the outer appearance. It is probable that the Dactylochalina species have undergone changes since then, and that these species of Chalinopsis have had to change their own shape accordingly so as always to remain similar to a defensive sponge. I would therefore call the similarity in these two cases, although it has originated in true relationship, Mimicry, because the structure of the important internal organs has changed, whilst no difference is perceptible in the outer appearance which is so very variable in sponges.

EXPLANATION OF PLATES.

PLATE, 39.

Fig. 1.—*Dendrilla cavernosa.* R. v. L.
Section through the sponge.
$\frac{1}{5}$th of the natural size.

Fig. 2.—*Dendrilla cavernosa.* R. v. L.
Pore membrane covering the vestibule lacunæ. Seen from the surface.
1:20 magnified.
Alcohol, Hæmatoxylin specimen.

Fig. 3.—*Dendrilla cavernosa.* R. v. L.
Pore membrane covering the vestibule lacunæ. Seen from above. Margin of one of the pores.
1:20 magnified.
Alcohol, Hæmatoxylin specimen.

Fig. 4.—*Dendrilla cavernosa.* R. v. L.
Transverse section through the pore membrane. Showing one pore.
1:80 magnified.
Alcohol, Hæmatoxylin.

Fig. 5.—*Dendrilla cavernosa.* R. v. L.
Transverse section through the pore membrane showing the margin of a pore.
1:800 magnified.
Alcohol, Hæmatoxylin specimen.

(a.) Amœboid wandering cells.
(m.) Muscular cells.
(g.) Ganglia cells.
(d) Gland cells.
(s.) Sensitive cells.
(p.) Flat epithel cells.

PLATE 40.

Fig. 6.—*Raphyrus Hixonii.* R. v. L.
Photographed from life.
En profil.
⅓ of the natural size.

PLATE 41.

Fig. 7.—*Raphyrus Hixonii.* R. v. L.
Transverse section through the outer portion of the sponge
1:50 magnified.
Alcohol, Hæmotoxylin.

Fig. 8.—*Raphyrus Hixonii.* R. v. L.
Some of the digestive amœboid wandering cells in the soft tissue of the internal meshes.
Spirit specimen.
1:400 magnified.

PLATE 42.

Fig. 9.—*Raphyrus Hixonii.* R. v. L.
Transverse section through the outer portion of the sponge.
1:15 magnified.
Alcohol, Hæmatoxylin.

Fig. 10.—*Raphyrus Hixonii.* R. v. L.
Bulb ac. spicule.
Most frequent shape in the supporting skeleton of the network.
1:150 magnified.

Fig. 11.—*Raphyrus Hixonii.* R. v. L.
Bulb ac. spicule. The head showing a spine.
1:250 magnified.

Fig. 12.—*Raphyrus Hixonii.* R. v. L.
Bulb ac. spicule, with a large spine. The head.
200:1 magnified.

Fig. 13.—*Raphyrus Hixonii.* R. v. L.
Bulb ac. spicule, the truncate end showing the extended terminus of the axial canal.
1:500 magnified.

Fig. 14.—*Raphyrus Hixonii.* R. v. L.
Tr. tr. sp. spicule of the dermal armour. Straight kind.
1:700 magnified.

Fig. 15.—*Raphyrus Hixonii.* R. v. L.
Tr. tr. sp. spicule of the dermal armour. Curved kind.
1:700 magnified.

Fig. 16.—*Raphyrus Hixonii.* R. v. L.
Ac. ac. sp. spicule of the soft tissue.
1:400 magnified.

Fig. 17.—*Raphyrus Hixonii.* R. v. L.
Tr. ac. spicule.
150:1 magnified.

PLATE 43.

Fig. 18.—*Chalinopsis imitatus.* R. v. L.
Photographed from a skeleton.
⅓ of the natural size.

Fig. 19.—*Dactylochalina cylindrica.* R. v. L.
Photographed from a skeleton.
½ of the natural size.

PLATE 44.

Fig. 20.—*Chalinopsis dichotoma.* R. v. L.
Photographed from a skeleton.
½ of the natural size.

Fig. 21.—*Dactylochalina reticulata.* R. v. L.
Photographed from a skeleton.
⅓ of the natural size.

DESCRIPTIONS OF NEW OR RARE AUSTRALIAN FISHES.

By E. Pierson Ramsay, F.R.S.E., and J. Douglas-Ogilby.

Pteroplatea australis. sp. nov.

Disk rather less than twice as wide as long; tail three-eighths of the length of the disk, without spine or rudimentary fin, but with faint indications of a cutaneous fold above and below. Spiracle provided with a tentacle. Teeth with a long median and two short lateral cusps. Skin smooth. Dark-brown, almost black above; white beneath; tail with two interrupted white rings about midway.

This fine species, belonging to a genus hitherto unknown from Australia, was forwarded some years ago by Mr. J. Brown from Cape Hawke, N. S. Wales, and measures twenty-three inches across the disk.

It is possible that this may be identical with the Mediterranean *P. altavela*, but in the absence of books of reference it is impossible to settle the question satisfactorily owing to the insufficient description given in the British Museum Catalogue.

Registered number in the Australian Museum A. 9357.

Cirrhitichthys aprinus, C. & V.

B. VI. D. 10/12-13. A. 3/6-7. V. 1/5. P. 7/7 or 8/6. C. 15. L. lat. 42. L. trans. 4/11.

Length of head rather more than 4, of caudal fin $5\frac{1}{3}$, height of body $2\frac{3}{4}$ in the total length. Diameter of eye $\frac{1}{4}$ of the length of the head, and $\frac{6}{7}$ of that of snout. Interorbital space concave, from $\frac{2}{3}$ to $\frac{3}{4}$ of the diameter of eye. Cleft of mouth oblique. Maxilla reaches to the vertical from anterior margin of eye. Preorbital and post-temporal serrated. Vertical limb of preopercle strongly serrated;

the posterior two-thirds of the lower limb armed with teeth which grow gradually smaller from behind; the anterior portion entire. A weak opercular spine. Villiform teeth with a greatly enlarged outer row in both jaws; lower jaw with two or three strong, and slightly curved lateral caninoid teeth; vomer with a semi-circular, palatines with narrow divergent bands of villiform teeth. Dorsal spines moderately strong, the fifth, sixth, and seventh, about equal and longest, equal to the distance between the snout and the hind margin of the eye; the first ray considerably, the second sometimes moderately filiform. Anal commences beneath the third dorsal ray, its second spine is much the longest and strongest, about equal to the longest dorsal spines. Simple pectoral rays much longer than the branched, ordinarily the second and third are the longest, but sometimes the fourth, and even the fifth, are equal to them; they are about $\frac{2}{7}$ of the total length. In some the ventrals reach beyond, in others not so far as, the vent. Caudal emarginate. Scales moderate; cheeks and opercles scaly; basal half of the fins more or less so.

Colors. Red above, white below the lateral line. Six broad dark vertical bands on the body, the first from the anterior dorsal spines to the root of the pectoral, and the two last on the free tail. Head spotted with vermilion and black, and with two narrow lines across it, the anterior of which passes through the eye; a narrow deep yellow line on the outer margin of the dorsal membranes; soft dorsal with blue-edged golden spots; the elongate ray banded red and white; the other fins pinkish; caudal without bars. Irides brassy; eyelids vermilion. In one specimen the red ground-colour is replaced by greenish-olive.

Our three examples are of nearly similar size, the largest being $4\frac{3}{4}$ inches; they were trawled off Shark Reef, Port Jackson; they differ from *Cirrhites graphidopterus*, Bleek, which he makes identical with *C. aprinus*, C. & V., and of which the Australian Museum possesses one of the types, in the greater height of the body only. The genus *Cirrhitichthys*, Bleeker, is identical with and takes precedence of *Neocirrhites*, Castelnau.

SEBASTES SCABER. sp. nov.

D. 12. 1/9. A. 3/5. V. 1/5. P. 18. C. 14. L. lat., circ. 37.

Length of head $2\frac{5}{6}$, of pectoral fin $3\frac{1}{2}$, height of body $3\frac{3}{4}$ in the total length. Diameter of eye $3\frac{1}{6}$ in length of head, rather more than the length of the snout; interorbital space $\frac{1}{2}$ a diameter of the eye. Maxilla reaches to below the last third of the orbit. Four strong spines at the pre-opercular angle. A single spine at the antero-superior angle of the eye; a row of strong spines from the supraorbital ridge to nearly opposite the origin of the dorsal fin; two opercular spines; a strong spine on the humeral bone. A moderate nasal tentacle. Teeth on the jaws and vomer; none on the palate. The sixth dorsal spine is the longest, about equal to the diameter of the eye; the thirteenth spine twice as long as that which precedes it; soft dorsal rather higher than the spinous. Anal much higher than the dorsal, the second spine being very strong, and one-half longer than the longest dorsal spine; it commences beneath the twelfth dorsal spine; the pectorals reach to opposite the first anal ray. Upper part of the head and interorbital space scaly. Lateral line armed with sharp curved spines pointing backwards.

Colors. Roseate with irregular dusky blotches.

The specimens from which the description has been drawn up were taken by the trawl on Shark Reef during August last; both are very small, the larger being but $2\frac{1}{4}$ inches in total length.

Registered numbers in the Australian Museum B. 8450,-51.

PLATYCEPHALUS ARENARIUS. sp. nov.

D. 7/13-14. A. 13-14. V. 1/5. P. 13/7. C. 18.

Length of head $3\frac{1}{4}$, of caudal fin $6\frac{2}{5}$, height of body $9\frac{1}{3}$ in the total length. Diameter of eye $6\frac{1}{4}$ in the length of head and $1\frac{9}{10}$ in that of snout. Interorbital space slightly concave, $\frac{3}{5}$ of the diameter of the eye. Median ridge faint, interrupted between and for some distance behind the eyes, appearing again on the occiput as a short sharp ridge. Width of head inside preopercular spines $\frac{3}{4}$ of its length. Maxillary extends to below first third of eye. Supra-orbital margin with a single minute anterior spine; two slightly divergent smooth occipital ridges with offshoots towards the central ridge; outside of these is an almost obsolete ridge, also smooth, which terminates at the origin of the lateral line in a minute spine. Two parallel smooth ridges originate in a pair of short preorbital spines, and terminate in a pair of rather divergent strong preopercular spines, the lower of which is a third longer than the upper; no visible opercular spines. An angular crenulated subopercular flap, beneath the preopercular spines. Anterior nostril with a simple tubular tentacle. Lower jaw the longer. Maxilla with a broad band of villiform teeth in front, gradually narrowing posteriorly; an edentate patch at the symphysis, bordered by larger teeth, the largest behind; mandibles with a lateral row of small curved teeth, and villiform patches in front; two small patches on the vomer; a row on the palatines. First dorsal spine so minute as hardly to be visible; the second the longest $1\frac{9}{10}$ in the length of head; soft dorsal highest anteriorly. Ventrals long, reaching to the third anal ray, $1\frac{3}{10}$ in the length of the head. Anal commences opposite the soft dorsal. Caudal truncate. Lateral line smooth.

Colors. Light yellowish-brown above, white below. Spines and rays of dorsals with chesnut bands, webs immaculate. Last five webs of anal dark, remainder and rays white. Ventral and pectoral rays banded. Ground color of caudal pure white, the upper half with three or four oblique parallel brown bands, the lower with two much broader black stripes.

Sand Flathead of Sydney; the specimen described is ten inches in length and was trawled in Middle Harbour.

LEPIDOTRIGLA PLEURACANTHICA, Rich.

B. VII. D. 9/13. A. 10. P. 11/3. V. 1/5. L. lat. 58. L. trans. 5/11.

Length of head $4\frac{1}{6}$, of caudal fin $5\frac{1}{2}$, height of body $6\frac{1}{10}$ in the total length. Diameter of eye $3\frac{3}{7}$ in length of head, and $\frac{7}{10}$ of that of snout. Interorbital space deeply concave, $\frac{2}{3}$ of the diameter of eye. Nasal profile abrupt, slightly concave. Three strong and several small spines on the antero-superior angles of the orbits ; a finely serrated ridge from thence to the postero-superior angles, where there is a short strongly toothed bony protuberance. Preorbital slightly serrated and emarginate. A short blunt spine at the preopercular angle which is produced. Two opercular spines, the lower much the longer. Scapula with two parallel serrated ridges, the upper of which terminates in a spine ; a single strong supra-scapular spine. The maxilla extends to the vertical from the first third of the eye. The two anterior dorsal spines serrated in front ; the third the longest, equal to the distance between the snout and the posterior edge of the orbit. Anal commences opposite to the fifth dorsal ray. The pectorals reach to the second anal ray, and are $3\frac{5}{8}$ in the total length. The ventrals reach to the vent. Caudal emarginate ; scales small, with 58 on the lateral line, each of which bears a strong curved tooth, having at its base below a second smaller rather divergent spine. The keeled row along the base of the dorsal is well developed, and consists of 20 scales, some of which, especially those in front, are bifid.

Colors. Bright red, with a few dusky markings above and lighter ones below the lateral line. A broad orange band across the white of the belly, in front of the bases of the ventrals ; mandibular region also orange. Spinous dorsal red with brown and yellow marblings, and a large black quadrangular spot, bordered with gold on the outer half of the fourth to sixth spines ; second dorsal red with a light margin, and a row of pale blue spots across the web. Anal light red, the last web and the margin white. Pectorals, outside pink densely marbled with green, yellow, and black, inside dark green at the base, deepening gradually to black near the extremity, and with a broad azure, marginal band. Ventrals red, lighter at the base, free rays tipped with gold. Caudal red with a light band across the anterior half and a light tip ; a dusky subterminal band. Lower lip with four white spots. Irides bright blue. Roof of the mouth orange.

The specimen was trawled in Port Jackson in April last, and measures 6·35 inches.

REMARKS ON THE *TRACHICHTHYS* OF PORT JACKSON.

By J. Douglas-Ogilby,

Senior-Assistant Zoologist, Australian Museum.

It having become necessary during the past month that I should examine the Beryciform fishes in the Australian Museum, I took the opportunity to pay special attention to the specimens of *Trachichthys* therein contained, and as my researches have convinced me that there is but one species found in these waters, I think it but right to lay the premises upon which I base my conclusion before this society in order that those who are interested may judge for themselves whether my rejection of *T. jacksoniensis* as a valid species is justified or not.

I have at present available for examination six examples taken in Port Jackson ; they are catalogued as follows :—

a.	A. 12916	Kiribilli Pt., N. Shore.	Presented by Mr. H. Cadell.
b.	B. 2313	Port Jackson.	,, ,, Dr. Eichler.
c.	B. 5924	North Shore.	,, ,, Mr. H. Cadell.
d.	B. 5925	,, ,,	,, ,, ,, ,, ,,
e.	unregistered	Port Jackson.	,, ,, ,, J. James, Coodgee
f.	,,	,, ,,	,, ,, ,, ,, ,, ,,

I shall designate each of these specimens by the alphabetical prefix attached thereto.

The Hon. Wm. Macleay, (Descr. Cat. of Aust. Fishes, Vol. i, p. 146), lays special stress on the greater number of spiniferous ventral plates, which however he allows to be variable (9-11), and in the greater height of the body. I shall endeavour to show in the following paper that these characters are unreliable, and that consequently *T. jacksoniensis* must sink to a synonym of the original *T. australis*.

Beginning then with specimen *f* which measures but four inches and is the smallest of our series I find that it possesses eight ventral plates, and the height of the body is not quite one-half of the length, without caudal (as 1 to 2·10); this then is a typical *T. australis* of Shaw, Cuvier, and Günther. Passing on now to specimen *c*, which measures over six inches we find that it also possesses eight ventral plates, but that the height of the body is rather more than half the length without caudal (as 1 to 1·90), being therefore intermediate between the two forms. Specimen *d* bears nine ventral plates, and its height is exactly half the length without caudal, thus not fulfilling the special requirements of either form, but going far to show how little dependence can be placed on such a variable character as the number of ventral plates; this example was taken at the same time and place as the preceding, and is a trifle the larger. Specimen *b* is but little larger than *f*; it bears but eight plates, but the last is twice as large as any of the others, and appears like two normal plates soldered together; I have therefore placed it among those bearing nine plates; the height of the body is more (1 to 1·88) than half the length without caudal; this is therefore a typical *T. jacksoniensis*; it measures barely 5½ inches. Finally our last specimen, *a*, from the same locality as *c* and *d*, exceeds Mr. Macleay's limits, having no less than twelve ventral plates, while the height of the body is exactly one-half its length without caudal.

To facilitate reference to their individual differences I here give a list of the examples showing the length, number of ventral plates, and comparative height of each :—

	a.	*b.*	*c.*	*d.*	*e.*	*f.*
Total length in inches	5·90	4·10	6·10	6·20	5·45	4.00
Number of ventral plates ...	12	?9	8	9	11	8
Height to length (s. c.) ...	1:2·00	1:1·88	1:1·90	1:2·00	1:1·85	1:2·10

I have gone thus carefully into the details of each individual, in order that, while stating it to be my conviction, that from the above facts the forms cannot be specifically separated, I can at the same time leave each one at liberty to settle the question for himself.

In the Trans. N. Zeal. Inst., vii., p. 245, Dr. Hector describes a New Zealand form under the name of *Trachichthys intermedius*, which possesses ten ventral plates, and the height of whose body is about 2·50 in the length, without caudal. This specimen, therefore, completes the chain of gradation between the high-bodied *T. jacksoniensis*, and the long-bodied *T. elongatus*, and leaves me no choice but to consider all these as forms of the same species, which must of course be known as *Trachichthys australis*.

Dr. Günther says that *T. elongatus* differs from *T. australis* in form as much as a Dace from a Crucian Carp; perhaps if we were to substitute Prussian Carp for Dace we would have a more parallel case, yet none would now-a-days think of separating *Carassius gibelio*, (or even *C. oblongus*) from *C. vulgaris*; nor, do I think, that the forms of *Trachichthys australis* can be separated.

CATALOGUE OF THE DESCRIBED COLEOPTERA OF AUSTRALIA.

By George Masters.

Part II.

Family. DYTISCIDÆ.

Sub-Family. HALIPLIDES.

HALIPLUS. Latreille.

961 Australis Clark. Journ. of Ent., 1862, I., p. 400.
South Australia.
962 bistriatus Wehncke. Stett. Ent. Zeit., 1880, XLI., p. 75.
Adelaide, South Australia.
963 fuscatus Clark. Journ. of Ent., 1862, I., p. 401.
South Australia.
964 gibbus Clark. Journ. of Ent., 1862, I., p. 402.
Moreton Bay; Queensland.
965 testudo Clark. Journ. of Ent., 1862, I., p. 400.
Moreton Bay; Queensland.

Sub-Family. PELOBIDES.

HYDRACHNA. Fabricius.

966 Australasiæ Clark. Journ. of Ent., 1862, I., p. 402.
Pelobius Australasiæ Clark.
N. S. Wales, Victoria, S. Australia.
967 nigra Clark. Journ. of Ent., 1862, I., p. 403.
Pelobius niger Clark.
N. S. Wales, and Queensland.

Sub Family. DYTISCIDES.

HYPHYDRUS. Illiger.

968 AUSTRALIS Clark. Journ. of Ent., 1862, I., p. 405.
South Australia.

969 BLANCHARDI Clark. Journ. of Ent., 1862, I., p. 404.
Victoria.

970 CONTIGUUS E. Wehncke. Stett. Ent. Zeit., 1877, p. 150.
Rockhampton ; Queensland.

971 DECEMMACULATUS E. Wehncke. Stett. Ent. Zeit, 1877, p. 151.
Cape York ; N. Australia.

972 HUMERALIS Clark. Journ. of Ent., 1862, I., p. 403.
Victoria.

BIDESSUS. Sharp.

973 AMABILIS Clark. Journ. of Ent., I., 1862, p. 240; Sharp Tr. Dubl. Soc., 1882 (2), II., p. 350.
Hydroporus amabilis Clark.
Moreton Bay ; Queensland.

974 BASALIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 124 ; Sharp, Trans. Dubl. Soc., 1882 (2), II., p. 356.
Hydroporus basalis Macleay.
Gayndah ; Queensland.

975 BIFORMIS Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 362.
Australia.

976 BISTRIGATUS Clark. Journ. of Ent., 1862, I., p. 419 ; Sharp, Tr. Dubl. Soc., 1882 (2), II., p. 351 ; E. Wehncke, Ent. MB., 1876, I., p. 92.
Hydroporus bistrigatus Clark
Hydroporus luridus Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 124.
Moreton Bay, Gayndah, &c. ; Queensland.

977 COMPACTUS Clark. Journ. of Ent., 1862, I., p. 421 ; Sharp, Tr. Dubl. Soc., 1882 (2), II., p. 362.
Hydroporus compactus Clark.
South Australia.

978 Dameli Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 357.
Queensland.

979 denticulatus Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 359.
Australia.

980 dispar Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 363.
Australia.

981 gemellus Clark. Journ. of Ent., 1862, I., p. 421; Sharp, Tr. Dubl. Soc., 1882 (2), II., p. 362.
Hydroporus gemellus Clark.
South Australia.

982 Godeffroyi Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 356.
Australia.

983 impressus Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 360.
Australia.

984 inornatus Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 360.
Western Australia.

985 Mastersi Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 123; Sharp, Tr. Dubl. Soc., 1882 (2), II., p. 357.
Hydroporus Mastersii Macleay.
Gayndah; Queensland.

986 migrator Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 345.
Australia.

987 mundus Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 362.
Australia.

988 orthogrammus Sharp. Tr. Dubl. Soc., 1882 (2), p. 357.
N. W. Australia.

989 Shuckhardi Clark. Journal of Ent., 1862, I, p. 420; Sharp, Tr. Dubl. Soc., 1882 (2), II., p. 361.
Hydroporus Shuckhardi Clark
Moreton Bay; Queensland.

990 signatus Sharp. Tr. Dubl. Soc., 1882 (2), II,, p. 356.
Australia.

NOTOMICRUS. Sharp.

991 lævigatus Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 107.
Australia.

992 SUTURALIS Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 261.
Australia.

HYDROCOPTUS. Motschulsky.

993 SUBFASCIATUS Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 261, t. IX., f. 108.
Australia.

HUXELHYDRUS. Sharp.

994 SYNTHETICUS Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 369.
North Australia.

995 BROWNI Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 385, t. XI., f. 140-141.
King George's Sound, W. Australia.

STERNOPRISCUS. Sharp.

996 CLAVATUS Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 386.
Sydney.

997 HANSARDI Clark. Journ. of Ent., 1862, I., p. 417; Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 385.
Hydroporus Hansardi Clark.
Moreton Bay.

998 MEADFOOTI Clark. Journ. of Ent., 1862, I., p. 419; Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 385.
Hydroporus Meadfooti Clark.
Victoria.

999 MULTIMACULATUS Clark. Journ. of Ent., 1862, I., p. 417; Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 385.
Hydroporus multimaculatus Clark.
South Australia.

1000 OBSCURUS Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 385.
King George's Sound; W. Australia.

1001 OSCILLATOR Sharp. Tr. Dubl. Soc., 1882 (2), p. 388.
Adelaide; S. Australia.

1002 SIGNATUS Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 386.
Murray River.

1003 TARSALIS Sharp. Tr. Dubl. Soc., 1882 (2), II.. p. 386.
Sydney.

1004 TASMANICUS Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 388.
Tasmania.

1005 WEHNCKII Sharp. Tr. Dubl. Soc., (2), II., p. 387.
Australia.

PAROSTER. Sharp.

1006 INSCULPTILIS Clark. Journ of. Ent., 1862, I., p. 411; Sharp, Tr. Dubl. Soc., 1882 (2), II., p. 391.
Hydroporus insculptilis Clark.
South Australia.

1007 NIGRO-ADUMBRATUS Clark. Journ. of Ent., 1862, I., p. 410; Sharp, Tr. Dubl. Soc., 1882 (2), II., p. 391.
Hydroporus nigro-adumbratus Clark.
South Australia.

1008 PALLESCENS Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 391, pl. XII., f. 143.
W. Australia.

CHOSTONECTES. Sharp.

1009 BAKEWELLII Clark. Journ. of Ent., 1862, I., p. 413; Sharp, Tr. Dubl. Soc., 1882 (2), II., p. 408.
Hydroporus Bakewellii Clark.
Moreton Bay; Queensland.

1010 GIGAS Bohem. Res. Eugen., 1858, p. 18; Sharp, Tr. Dubl. Soc., 1882 (2), II., p. 408, pl. XII., f. 148.
Hydroporus gigas Bohem.
Hyphydrus humeralis Clark. Journ. of Ent., 1862, I., p. 405; E. Wehncke, Ent. MB., 1876, I., p. 92.
New South Wales and Queensland.

1011 JOHNSONI Clark. Journ. of Ent., 1862, I., p. 405; Sharp, Tr. Dubl. Soc., 1882 (2), II., p. 408.
Hyphydrus Johnsonii Clark
Victoria.

1012 LATUS Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 409.
Victoria.

1013 NEBULOSUS Macleay. Trans. Ent. Soc, N. S Wales, 1871, II., p. 123; Sharp, Tr. Dubl. Soc., 1882 (2), II., p. 148.
Hydroporus nebulosus Macleay.
Gayndah; Queensland.

1014 SHARPI (Wehncke MSS.) Sharp. Tr. Doubl. Soc., 1882 (2). II., p. 409.
N. S. Wales.

ANTIPORUS. Sharp.

1015 BLAKEI Clark. Journ, of Ent., 1862, I., p. 411; Sharp. Tr. Dubl. Soc.. 1882 (2), II., p. 412.
Hydroporus Blakei Clark.
Australia.

1016 COLLARIS Hope. Proc. Ent. Soc. Lond., 1841, p. 48; Sharp. Tr. Dubl. Soc., 1882, App., p. 790.
Hpdroporus collaris Hope.
thoracicus Schaum. White. Cat., p. 43.
Port Essington; N. Australia.

1017 CURTULUS Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 412.
Sydney.

1018 FEMORALIS Bohem. Res. Eugen., 1858, p. 19; Sharp. Tr. Dubl. Soc., 1882 (2) II., p. 411.
Hydroporus femoralis Bohem.
Sydney.

1019 GILBERTI Clark. Journ. of Ent., 1862, I., p. 414; Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 411.
Hydroporus Gilberti Clark.
Victoria.

1020 GRAVIDUS Clark. Journ. of Ent., 1862, I., p. 413; Sharp. Tr. Dubl. Soc., 1882, p. 411.
Hydroporus gravidus Clark.
Port Essington; N. Australia.

1021 INTERROGATIONIS Clark. Journ. of Ent., 1862, I., p. 408; Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 411.
Hydroporus interrogationis Clark.
South Australia.

MACROPORUS. Sharp.

1022 Gardneri Clark. Journ. of Ent., 1862, I., p. 408; Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 417.
Hydroporus Gardneri Clark.
Victoria.

1023 hamatus Clark. Jour. of Ent., 1862, I, p. 407; Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 417.
Hydroporus hamatus Clark.
Victoria.

1024 Howittii Clark. Journ. of Ent., 1862, I., p. 466; Sharp, Tr. Dubl. Soc., 1882 (2), II., p. 417.
Hydroporus Howittii Clark.
Victoria, and S. Australia.

1025 lateralis Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 417.
W. Australia.

1026 ruficeps Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 418.
Australia.

1027 solidus Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 418.
King George's Sound; W. Australia.

HYDROPORUS. Clairville.

1028 bifasciatus Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 121.
Gayndah; Queensland.

1029 brunnipennis Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 122.
Gayndah; Queensland.

1030 fossulipennis Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 122.
Gayndah; Queensland.

1031 foveiceps Macleay, Trans. Ent. Soc., N. S. Wales, 1871, II., p. 122.
Gayndah; Queensland.

1032 POLITUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 124.
Gayndah ; Queensland.

1033 SINUATOCOLLIS Clark. Journ. of Ent., 1862, I., p. 418.
South Australia.

1034 UNDECIMMACULATUS Clark. Journ. of Ent., 1862, I., p. 412.
Port Essington ; N. Australia.

NECTEROSOMA. Macleay.

1035 ARCUATUM Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 415.
Australia.

1036 DARWINII Babingt. Trans. Ent. Soc. Lond., 1841, II., p. 13 ; Sharp. Tr, Dubl. Soc., 1882 (2), II., p. 413.
Hydroporus Darwinii Babingt.
Australia.

1037 DISPAR Germ. Linn. Ent., 1848, III., p. 173 ; Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 415.
Hydroporus dispar Germ.
South Australia.

1038 PENICILLATUS Clark, Journ. of Ent., 1862, I., p. 415 ; Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 413.
Hydroporus penicillatus Clark.
Victoria.

1039 REGULARE Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 415.
Australia.

1040 SCHMELTZI Sharp. Tr. Dubl. Soc., 1882 (2), p. 414, t. XII., f. 150.

1041 VITTIPENNE Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 125.
Gayndah ; Queensland.

1042 WOLLASTONI Clark. Journ. of Ent., 1862, I., p. 416.
Hydroporus Wollastoni Clark.
? *flavicolle* Macleay. Trans Ent. Soc., N. S. Wales, 1871. II., p. 125 ; E. Wehncke. Ent. MB., 1876, I., p. 92.
Victoria, N. S. Wales, Tasmania, Queensland.

HYDROCANTHUS. Say.

1043 AUSTRALASIÆ E. Wehncke. Deutsche. Ent. Zeit. 1876, p. 224.
North Australia.

PLATYNECTES. Sharp.

1044 ÆNESCENS Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 538.
Australia.
1045 BAKEWELLII Clark. Journ. of Ent., 1863, II., p. 19.
Agabus Bakewellii Clark.
South Australia.
1046 DAMELII Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 542.
Australia.
1047 DECEMPUNCTATUS Fab. Syst. Ent., p. 232; Sharp, Tr. Dubl. Soc., 1882 (2), II., p. 538, pl. XIV., f. 175.
Agabus decempunctatus Fab.
Australia.
1048 LATISSIMUS Clark. Journ. of Ent., 1863, II., p. 18; Sharp, Tr. Dubl. Soc., 1882 (2), II., p. 538.
Agabus latissimus Clark.
Australia.
1049 LIMBATUS Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 539.
Australia.
1050 LUGUBRIS Blanch. Voy. Pole. Sud. IV., p. 49, t. 4, f. 4.
Agabus lugubris Blanch.
Tasmania.
1051 MASTERSI Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 126.
Agabus Mastersi Macleay.
Gayndah; Queensland.
1052 OBSCURUS Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 539.
Tasmania.
1053 RETICULOSUS Clark. Journ. of Ent., 1863, II., p. 19 Sharp, Tr. Dubl. Soc., 1882 (2), II., p. 538.
Agabus reticulosus Clark.

1054 SPILOPTERUS Germ. Linn. Ent., III., p. 172.
Agabus spilopterus Germ.
South Australia.

1055. TASMANIÆ Clark. Journ. of Ent., 1863, II., p. 18.
Agabus Tasmaniæ Clark.
Tasmania.

CELINA. Aubé.

1056 AUSTRALIS Clark. Journ. of Ent., 1863, II., p. 14.
New South Wales, Victoria and S. Australia.

LANCESTES. Sharp.

1057 LANCEOLATUS Clark. Journ. of Ent., 1863, II., p. 16; Sharp, Tr. Dubl. Soc., 1882 (2), II., p. 603, pl. XVI., f. 194.
Colymbetes lanceolatus Clark.
New South Wales, Victoria, S. Australia and Tasmania.

RHANTUS. Lacordaire.

1058 PULVEROSUS Steph. Ill. Brit., II., p. 69, t. 12, f. 2.
Australis Aubé. Spec., p. 236.
Australia (widely distributed).

COLYMBETES. Clairville.

1059 MONOSTIGMA Hope. Proc. Ent. Soc., 1842, p. 47.
Port Essington ; N. Australia.

1060 PULCHER Clark. Journ. of Ent., 1863, II., p. 16.
South Australia.

COPELATUS. Erichson.

1061 ACUDUCTUS Clark. Journ. of Ent., 1863, II., p. 21.
South Australia.

1062 ATER Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 566.
Swan River; W. Australia.

1063 AUSTRALIÆ Clark. Journ. of Ent., 1863, II., p. 20.
Moreton Bay, Gayndah, &c. ; Queensland.

1064 Australis Clark. Journ. of Ent., 1863, II., p. 14 ; Sharp Tr. Dubl. Soc., 1882 (2), p. 564.
Australia.

1065 Clarki Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 585.
Cape York ; N. Australia.

1066 Damelii Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 593.
Cape York ; N. Australia.

1067 elongatulus Macleay. Trans. Ent. N. S. Wales, 1871, II., p. 126.
Gayndah ; Queensland.

1068 extensus Sharp. Tr. Dubl. Soc., 1882 (2). II., p. 566.
Brisbane ; Queensland.

1069 ferrugineus Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 565.
Port Denison ; Queensland.

1070 gracilis Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 564.
Rockampton ; Queensland.

1071 ipregularis Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 126.
Gayndah, Rockampton, Port Denison, &c., Queensland.

1072 labratus Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 565.
Melbourne ; Victoria.

1073 lividus Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 565.
Adelaide, Melbourne, &c.

1074 marginatus Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 579.
Australia.

1075 melanarius Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 567.
Clarence River ; N. S. Wales.

1076 nigritulus Sharp. Tr. Dubl. Soc. 1882, (2), II., p. 567.
Australia and Tasmania.

1077 nigro-lineatus Sharp. Tr. Dubl. Soc., 1882 (2), p. 577.
Australia.

1078 simplex Clark. Journ. of Ent., 1863, II., p. 21.
Tasmania.

1079 Victoriæ Clark. Journ. of Ent. 1863, II., p. 22.
Victoria.

MATUS. Aubé.

1080 Damelii Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 600.
Sydney.

1081 Wingii Clark. Jour. of Ent., 1863, II., p. 15; Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 600.
Batrachomatus Wingi Clark.
Gayndah, Rockampton, &c.; Queensland.

HYDERODES. Hope.

1082 collaris Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 634.
Australia.

1083 crassus Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 633.
Australia.

1084 Shuckhardi Hope. Coleop. Man., II., p. 166, t. 3, f. 5; Clark, Journ. of Ent., 1863, II., p. 22.
Victoria.

SANDRACOTTUS. Sharp.

1085 Bakewellii Clark. Trans. Ent. Soc., Lond, 1864, p. 210; Sharp, Tr. Dubl. Soc., 1882 (2), II., p. 687.
Hydaticus Bakewellii Clark.
Moreton Bay; Queensland.

1086 guttatus Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 688.
Australia.

CYBISTER. Curtis.

1087 Gayndahensis Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 127.
Gayndah; Queensland.

1088 Godeffroyi E. Wehncke. Stett. Ent. Zeit., 1876, XXXVII., p. 357.
Cape York; N. Australia.

1089 Simoni Regimbart. Bull. Soc. Ent. Fr., 1877, p. CLI.
Cape York; N. Australia.

HOMŒODYTES. Sharp.

1090 ATRATUS Fab. Syst. El., I., p. 259; Schaum, Stett. Ent. Zeit., 1847; Sharp, Tr. Dubl. Soc., 1882 (2), II., p. 703.
Dytiscus atratus Fab.
Australia.

1091 GORYI Aubé. Spec., p. 81; Sharp, Tr. Dubl. Soc., 1882, App., p. 771.
Cybister Goryi Aubé.
Australia.

1092 INSULARIS Hope. Proc. Ent. Soc. Lond., 1842, p. 47; Sharp, Tr. Dubl. Soc., 1882, App., p. 771.
Cybister insularis Hope.
Tasmania.

1093 SCUTELLARIS Germ. Linn. Ent., III., p. 171; Sharp, Tr. Dubl. Soc., 1882 (2), II., p. 703.
Cybister scutellaris Germ.
South Australia and Victoria.

SPENCERHYDRUS. Sharp.

1094 LATECINCTUS Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 702, pl. XVIII., f. 219.
Australia.

1095 PULCHELLUS Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 701.
Australia.

1096 SEMIFLAVUS Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 702.
Australia

LACCOPHILUS. Leach.

1097 CINGULATUS Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 214.
Australia.

1098 CLARKI Sharp. Tr. Dubl. Soc., 1882 (2) II., p. 313.
Australia.

1099 QUADRIMACULATUS Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 313.
Australia.

1100 RELIGATUS Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 316.
Australia.

1101 UNIFASCIATUS Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 303.
Rockhampton ; Queensland.

HYDROVATUS. Motschulsky.

1102 FASCIATUS Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 326.
Australia.

1103 NIGRITA Sharp. Tr. Dubl. Soc , 1882 (2), II., p. 333.
Australia.

1104 OPACUS Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 331.
Australia.

1105 OVALIS Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 327.
Brisbane ; Queensland.

1106 PARALLELUS Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 330.
Australia.

1107 POLITUS Sharp. Tr. Dubl. Soc., 1882 (2), II., p. 332.
Australia.

ERETES. Castelnau.

1108 AUSTRALIS Erichs. Weigm. Arch., 1842, I., p. 134.
Eunectes australis Erich.
Ericksoni White. Cat. Hydroc.. p. 10.
Tasmania.

1109 PUNCTIPENNIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 127.
Eunectes punctipennis Macleay.
Gayndah ; Queensland.

HYDATICUS. Leach.

1110 BIHAMATUS Aubé. Spec.. p. 174 ; Eschsch. Dej. Cat., 3 ed., p. 61.
Goryi Aubé. Spec., p. 175.
scriptus Blanch. Voy. Pole. Sud., IV., p. 46, t. 4, f. 1.
N. S. Wales and Queensland.

1111 BOWRINGI Clark. Trans. Ent. Soc., 1864 p. 214, t. 14, f. 3.
Australia.

1112 consanguineus Aubé. Spec., p. 160.
N. S. Wales and Queensland.

1113 Damelii E. Wehncke. Stett. Ent. Zeit., 1876, p. 195.
Cape York; N. Australia.

1114 ruficollis Fab. Mant. I., p. 189; Oliv. Ent., III., 40, t. 2, f. 10.
Tasmania.

1115 vittatus Fab. Syst. Ent. App., p. 825; Oliv., Ent., III., 40, p. 20, t. 1, f. 5; Aubé. Spec., p. 208.
limbatus Dehaan. Dej. Cat., 3 ed., p. 61.
quadrivittatus Blanch. Voy. Pole. Sud., IV., p. 48, t. 4, f. 3.
Northern parts of N. S. Wales and Queensland.

Family. GYRINIDÆ.

ENHYDRUS. Castelnau.

1116 assimilis Clark. Journ. of Ent., 1863, II., p. 217.
Australia.

1117 Howittii Clark. Journ. of Ent., 1863, II., p. 215.
Moreton Bay; Queensland.

1118 latior Clark. Journ. of Ent., 1863, II., p. 217.
Moreton Bay; Queensland.

1119 oblongus Boisd. Voy. Astrol. Ent. p. 52; Aubé, Spec. p. 653; Dej. Cat., 3 ed., p. 66.
Australis Brullé. Hist. Nat. Ins. V., p. 237.
Southern parts of Queensland.

1120 Reichei Aubé. Spec., 654; Clark, Journ. of Ent. 1863, II., pp. 216.
South Australia and Victoria.

1121 rivularis Clark. Journ. of Ent., 1863, II., p. 218.
Victoria.

MACROGYRUS. Régimbart.

1122 angustatus Régim. Ann. Soc. Ent. Fr., 1882 (6), II., p. 448.
Australia.

1123 CANALICULATUS Régim. Ann. Soc. Ent. Fr., 1882 (6), II., p. 450.
Australia.

1124 ELONGATULUS Régim. Ann. Soc. Ent. Fr., 1882 (6), II., p. 447.
Australia.

1125 LONGIPES Régim. Ann. Soc. Ent. Fr., 1882 (6), II., p. 452.
Australia.

1126 PARADOXUS Régim. Ann. Soc. Ent. Fr., 1882 (6), II., p. 455, pl. XII., f. 64.
Australia.

1127 SIMONI Régim. Ann. Soc. Ent. Fr., 1882 (6), II., p. 447, pl. XII., f. 60.
New South Wales.

GYRINUS. Geoffroy.

1128 CONVEXIUSCULUS Macleay, Trns. Ent. Soc., N. S. Wales, 1871, II., p. 128.
N. S. Wales and Queensland.

1129 IRIDIS Hope. Ann. Nat. Hist., 1842, IX., p. 428; Proc. Ent. Soc,, 1842, p. 48.
Australia.

1130 OBLIQUATUS Aubé. Spec., p. 661.
Australia. (Widely distributed.)

1131 STRIGOSUS Fab. Syst. El., I., p. 276; Suffr. Stett. Ent. Zeit., 1847, p. 101.
Australia.

1132 VENATOR Boisd. Voy. Astrol., II., p. 52; Aubé. Spec., p. 662; W. S. Macleay. Dej. Cat. 3 ed., p. 66.
Australia.

DINEUTES. W. S. Macleay.

1133 AUSTRALIS Fab. Syst. Ent., p. 235; Oliv. Ent., III., 41, p. 12, t. 1, f. 4; Schaum. Stett. Ent. Zeit., 1847, p. 54.
dentatus Suffrian. Stett. Ent. Zeit., 1842, p. 256.
Australia.

1134 CALIGINOSUS Régim. Ann. Soc. Ent. Fr., 1882 (6), II.,
p. 397.
Australia.

1135 GOULDI Hope. Ann. Nat. Hist., 1842, IX., p. 427; Proc.
Ent. Soc., 1842, p. 48.
North Australia.

1136 RUFIPES Fab. Syst. El., I., p. 276.
Australis Aubé. Spec., p. 785.
Australia.

Family. HYDROPHYLLIDÆ.

HYDROPHILUS. Geoffroy.

1137 ALBIPES Casteln. Hist. Nat., II., p. 51.
Australia.

1138 GAYNDAHENSIS Macleay. Trans. Ent. Soc., N. S. Wales,
1871, II., p. 129.
Gayndah; Queensland.

1139 LATIPALPUS Casteln. Hist. Nat., II., p. 51.
Victoria and N. S. Wales.

1140 RUFICORNIS Klug. Ins. Madag., p. 159; Latrl. Dej. Cat.,
3 ed., p. 148.
resplendens Eschsch. Dej. Cat., 3 ed., p. 148.
Australia.

STERNOLOPHUS. Solier.

1141 NITIDULUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871,
II., p. 129.
Gayndah; Queensland.

HYDROBIUS. Leach.

1142 ASSIMILIS Hope. Proc. Ent. Soc, 1842, p. 48; Ann. Nat.
Hist., 1842, IX., p. 428.
Australia.

1143 MARGINICOLLIS Hope. Proc. Ent. Soc., 1842, p. 48; Ann. Nat. Hist., 1842, IX., p. 428.
Australia.

HYDATOTREPHIS. Macleay.

1144 MASTERSI Macleay, Trans. Ent. Soc., N. S. Wales, 1871, II., p. 130.
Gayndah; Queensland.

PHILHYDRUS. Solier.

1145 ELONGATULUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 130.
Gayndah; Queensland.

1146 MACULICEPS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 130.
Gayndah; Queensland.

1147 MARMORATUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 130.
Gayndah; Queensland.

HYDROBATICUS. Macleay.

1148 LURIDUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 131.
Gayndah; Queensland.

1149 TRISTIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 131.
Gayndah; Queensland.

HYGROTROPHUS. Macleay.

1150 INVOLUTUS Macleay. Trans. Ent, Soc., N. S. Wales, 1871, II., p. 132.
Gayndah; Queensland.

1151 NUTANS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 132.
Gayndah; Queensland.

BEROSUS. Leach.

1152. AUSTRALIÆ Muls. Opusc. Ent., 1859, IX., p. 58.
Australia.

HYDROCHUS. Leach.

1153 AUSTRALIS Motsch. Schrenck. Reis., 1860, p. 104.
Australia.

1154 PARALLELUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 133.
Gayndah ; Queensland.

HYDRÆNA. Kugelann.

1155 LURIDIPENNIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 133.
Gayndah ; Queensland.

CYCLONOTUM. Erichson.

1156 MASTERSI Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 133.
Gayndah ; Queensland.

1157 PYGMÆUM Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 133.
Gayndah ; Queensland.

CERCYON. Leach.

1158 DORSALIS Erich. Wiegm. Arch. 1842, I., p. 153.
Tasmania.

Family. STAPHYLINIDÆ.

Sub-Family. ALEOCHARIDES.

MYRMECOCEPHALUS. Macleay.

1159 CINGULATUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 134 ; Fvl., Ann. Mus. Civ. Gen., 1877, X., p. 296.
Gayndah ; Queensland.

1160 FAUVELI Solsky. Hor. Soc. Ent. Ross., 1867, V., p. 113.
Falagria Fauveli Solsky.
bicingulatus Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 134; Fvl., Ann. Mus. Civ. Gen., 1877, X., 296; 1878, XIII., p. 596.
Gayndah; Queensland.

BOLITOCHARA. Mannerheim.

1161 DISCICOLLIS Fvl. Ann. Mus. Civ. Gen., 1879. XIII., p. 595.
Australia.

SILUSA. Erichson.

1162 MELANOGASTRA Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 590.
Melbourne; Victoria.

1163 PALLENS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 590.
W. Australia.

ALEOCHARA. Gravenhorst.

1164 BRACHIALIS Jekel. Col. Jekel., 1873, p. 39.
N. S. Wales.

1165 HÆMORRHOIDALIS Guér. Voy. Coquille. Ins., II., p. 63, t. 1, f. 24; Erichs. Gen., p. 176.
Australia. (Widely distributed.)

1166 MASTERSI Macleay, Trans. Ent. Soc., N. S. Wales, 1871, II., p. 136.
Gayndah; Queensland.

1167 PUNCTUM Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 593.
N. S. Wales.

1168 SEMIRUBER Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 293.
Australia.

1169 SPECULIFERA Erichs. Wiegm. Arch., 1842, I., p. 134.
Tasmania.

CORREA. Fauvel.

1170 OXYTELINA Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 592.
Adelaide; S. Australia.

POLYLOBUS. Solier.

1171 APICALIS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 285.
Victoria.

1172 ATERRIMUS Fvl. Ann. Mus. Civ. Gen., 1878, XIII , p. 586.
Australia.

1173 CINCTUS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 284.
Victoria.

1174 FLAVICOLLIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 135; Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 284.
Homalota flavicollis Macleay.
Gayndah ; Queensland.

1175 INSECATUS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 585.
Queensland.

1176 PALLIDIPENNIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 135.
Homalota pallidipennis Macleay.
Gayndah ; Queensland.

1177 PAVICORNIS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 586.
Victoria.

MYRMEDONIA. Erichson.

1178 AUSTRALIS Macleay. Trans. Ent. Soc., N S. Wales, 1871, II., p. 135.
Gayndah ; Queensland.

1179 CLAVIGERA Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 588.
Sydney ; N. S. Wales.

1180 INSIGNICORNIS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 589.
Australia.

PELIOPTERA. Kraatz.

1181 SPECULARIS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 579.
Sydney ; N. S. Wales.

CALODERA. Mannerheim.

1182 ABDOMINALIS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 580.
Australia.

1183 AUSTRALIS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 287; 1878, XIII., p. 580.
Australia.

1184 CORACINA Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 135; Fvl., Ann. Mus. Civ. Gen., 1877, X., p. 287.
Tachyusa coracina Macleay.
Gayndah; Queensland.

1185 CRIBELLA Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 287; XIII., p. 581.
W. Australia.

1186 INÆQUALIS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 286; XIII., p. 580.
Victoria.

1187 MACILENTA Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 581.
Victoria.

1188 RUFICOLLIS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 581.
Sydney; N. S. Wales.

MYRMECOPORA. Saulcy.

1189 SENILIS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 582.
Victoria.

GNYPETA. Thomson.

1190 FULGIDA Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 583.
Melbourne; Victoria.

OXYPODA. Mannerheim.

1191 ANALIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 135; Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 283.
Gayndah; Queensland.

1192 BISULCATA Redtenb. Reis. Novar., 1867, II., p. 27.
Sydney; N. S. Wales,

1193 VARIEGATA Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 584.
Sydney; N. S. Wales.

1194 VINCTA Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 584.
N. S. Wales.

HOMALOTA. Mannerheim.

1195 AUSTRALIS Jekel. Col. Jekel., 1873, I., p. 47.
N. S. Wales.

1196 GENTILIS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 578.
Australia.

1197 PICEICOLLIS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 577.
Sydney; N. S. Wales.

1198 POLITULA Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 577.
Adelaide; S. Australia.

1199 ROBUSTICORNIS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 576.
Sydney; N. S. Wales.

PLACUSA. Erichson.

1200 TENUICORNIS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 575,
Australia.

1201 TRIDENS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 574.
Sydney; N. S. Wales.

PHLŒOPORA. Erichson.

1202 GRATIOSA Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 587.
W. Australia.

1203 LÆVIUSCULA Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 587.
Victoria.

OLIGOTA. Mannerheim.

1204 ASPERIVENTRIS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 573.
Victoria.

GYROPHÆNA. Mannerheim.

1205 CRIBROSA Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 569.
Sydney; N. S. Wales.

BRACHIDA. Mulsant et Rey.

1206 ANNULATA Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 572.
Sydney; N. S. Wales.

1207 ATRICEPS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 571.
Victoria.

1208 BASIVENTRIS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 571.
Sydney ; N. S. Wales.

1209 SUTURALIS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 570.
Adelaide ; N. S. Wales.

DINOPSIS. Matthews.

1210 AUSTRALIS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 567.
Victoria.

Sub-Family. TACHYPORIDES.

LEUCOCRASPEDUM. Kraatz.

1211 SIDNEENSE Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 281 ; 1878, XIII., p. 566.
Sydney ; N. S. Wales.

CILEA. Jacquelin-Duval.

1212 ATRICEPS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 136 ; Fvl., Ann. Mus. Civ. Gen., 1877, X., p. 279.
Conurus atriceps Macleay.
Gayndah ; Queensland.

1213 DISCIPENNIS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 563.
Sydney ; N. S. Wales.

1214 RUBRICOLLIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 137 ; Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 279.
Tachyporus rubricollis Macleay.
Gayndah ; Queensland.

1215 RUFIPALPIS Macleay. Trans. Ent. Soc. N. S. Wales, 1871, II., p. 136 ; Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 278.
Conurus rufipalpis Macleay.

1216 TRISTIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 136 ; Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 279.
Tachyporus tristis Macleay.
Gayndah ; Queensland.

AMBLYOPINUS. Solsky.

1217 JANSONI Matth. Cist. Ent., 1878, II., p. 275.
Myotyplus Jansoni Matth.
Tasmania.

TACHYNODERUS. Motschulsky.

1218 AUSTRALIS Fvl. Ann, Mus. Civ. Gen., 1877, X., p. 277.
Queensland.

1219 ELONGATULUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 136; Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 276.
Conurus elongatulus Maclay.
Gayndah; Queensland.

1220 HÆMORRHOUS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 277.
Tasmania.

CONURUS. Stevens.

1221 AUSTRALIS Erichs. Gen., p. 221.
Tasmania.

1222 DISCUS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 565.
Victoria.

1223 FUMATUS Erichs. Gen., p. 221.
Tasmania.

1224 IMPENNIS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 564.
King George's Sound; W. Australia.

1225 PERSONATUS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 566.
New South Wales.

1226 STIGMALIS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 280; 1878, XIII., p. 564.
Australia.

1227 TRIANGULUM Fvl. Ann. Mus. Civ., Gen., 1878, XIII., p. 565.
Australia.

Sub-Family. STAPHYLINIDES.

TANYGNATHUS. Erichson.

1228 AUSTRALASIÆ Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 562.
Victoria.

ACYLOPHORUS. Nordmann.

1229 ASPERATUS Fvl. Ann. Mus. Civ. Gen., 1878. XIII., p. 561.
Victoria.

QUEDIOPSIS. Fauvel.

1230 ABDOMINALIS Fvl. Ann. Mus. Civ. Gen., 1878, XIII. p. 561.
Victoria.

1231 LUGUBRIS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 560.
Victoria.

HETEROTHOPS. Stephenson.

1232 BIMACULATA Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 557.
Sydney ; New South Wales.

1233 FLAVICOLLIS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 559.
Sydney ; N. S. Wales.

1234 LATICEPS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 558.
Queensland.

1235 LUCTUOSA Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 275.
Australia.

1236 PICIPENNIS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 276; XIII., p. 558.
Victoria.

1237 SEMICUPREA Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 557.
Queensland.

1238 TIBIALIS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 559.
Victoria.

QUEDIUS. Stephens.

1239 ÆNEUS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 274.
Victoria.

1240 ANALIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 142 ; Fvl. Ann. Mus. Civ. Gen., 1977, X., p. 274.
Staphylinus analis Macleay.
Gayndah ; Queensland.

1241 CHALYBEIPENNIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 141; Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 271.
Philonthus chalybeipennis Macleay.
Gayndah; Queensland.

1242 CUPRINUS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 274.
N. S. Wales.

1243 DICHROUS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 553.
Victoria.

1244 DIVERSIPENNIS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 554.
Swan River; W. Australia.

1245 IRIDIVENTRIS Fvl. Ann. Mus. Civ. Gen., 1877, X, p. 272.
N. S. Wales.

1246 LURIDIPENNIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 142; Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 274.
Staphylinus luridipennis Macleay.
Gayndah; Queensland.

1247 LURIDUS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 272.
W. Australia.

1248 METALLICUS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 556.
Queensland.

1249 NIGRICOLLIS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 271.
Rockhampton; Queensland.

1250 PICEOLUS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 554.
Victoria.

1251 POLITULUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 140; Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 272.
Philonthus politulus Macleay.
Gayndah; Queensland.

1252 RUBRICOLLIS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 554.
Victoria.

1253 SEMIVIOLACEUS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 556.
Australia.

1254 SIDNEENSIS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 269.
New South Wales.

1255 SUBCINGULATUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 141; Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 270.
Philonthus subcingulatus Macleay.
Gayndah; Queensland.

1256 SULCICOLLIS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 269.
Australia.

1257 THORACICUS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 271; XIII., p. 553.
Australia.

1258 VERSICOLOR Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 273; XIII., p. 553.
Queensland.

1259 VIRIDESCENS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 555.
W. Australia.

1260 XANTHOLINOIDES Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 141; Fvl., Ann. Mus. Civ. Gen., 1877, X., p. 275.
Philonthus xantholinoides Macleay.
Gayndah; Queensland.

ANTIMERUS. Fauvel.

1261 SMARAGDINUS Fvl. Ann Mus. Civ. Gen., 1878, XIII., p. 550.
Victoria.

CREOPHILUS. Mannerheim.

1262 ERYTHROCEPHALUS. Fab. Syst. Ent., p. 265; Oliv. Ent., III., 42, p. 12, t. 2, f. 9; Erichs. Gen., p. 351.
Australia. (Widely distributed.)

1263 LANIO Erichs. Gen., p. 352.
Oculatus var. Grav. Mon., p. 127.
Tasmania.

OCYPUS. Stephens.

1264 AUSTRALIS Redtenb. Reis. Novar., 1867, II., p. 28.
Sydney; N. S. Wales.

PHILONTHUS. Curtis.

1265 ANTIPODUM Fvl. Ann. Mus. Civ. Gen,, 1877, X., p. 263.
Australia.
1266 MACELLUS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 264; 1878, XIII., p. 547.
Victoria.
1267 OREOPHILUS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 265.
Australia.
1268 PACIFICUS Erichs. Gen., p. 501.
Tasmania.
1269 PILIPENNIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 140; Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 264.
Gayndah; Queensland.
1270 SANGUINICOLLIS Fvl. Ann. Mus. Civ. Gen. 1877, X., p. 265.
Victoria.

CAFIUS. Stephens.

1271 AREOLATUS Fvl. Ann. Mus. Civ. Gen., 1877, X., p 251; 1878, XIII., p. 541.
Victoria.
1272 CATENATUS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 256; 1878, XIII., p. 541.
N. S. Wales.
1273 LITTORALIS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 254.
Australia.
1274 SABULOSUS Fvl. Ann. Mus. Civ. Gen., 1877, X. p. 253.
Australia.
1275 SERIATUS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 255; 1878, XIII., p. 541.
Victoria.

1276 VELUTINUS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 256; 1878, XIII., p. 541.
New South Wales.

HESPERUS. Fauvel.

1277 AUSTRALIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 139; Fvl., Ann. Mus. Civ. Gen., 1877, X., p. 260; 1878, XIII., p. 543.
Philonthus Australis Macleay.
Gayndah; Queensland.

1278 HÆMORRHOIDALIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 140; Fvl., Ann. Mus. Civ., Gen., 1877, X., p. 260.
Philonthus hæmorrhoidalis Macleay.
Gayndah; Queensland.

1279 MIRABILIS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 260; 1878, XIII., p. 543.
Queensland.

1280 SEMIRUFUS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 543.
South Australia.

BELONUCHUS. Nordmann.

1281 BREVICOLLIS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 267.
Australia.

1282 DHORNI Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 266.
South Australia.

XANTHOLINUS. Serville.

1283 ATRICEPS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 138.
Gayndah; Queensland.

1284 CERVINIPENNIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 138.
Gayndah; Queensland.

1285 CHALCOPTERUS Erichs. Gen., p. 312.
Swan River; W. Australia.

1286 CHLOROPTERUS Erichs. Gen., p. 311.
Tasmania.

1287 CŒLESTES Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 540.
Victoria.

1288 CRIBRATUS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 540.
Victoria.

1289 CYANEIPENNIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 139.
Gayndah ; Queensland.

1290 DUBIUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 139 ; Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 247.
Gayndah ; Queensland.

1291 ERYTHROPTERUS Erichs. Gen. p. 320.
Australia.

1292 HÆMORRHOUS Fvl. Ann. Mus. Cuv. Gen., 1878, XIII., p. 538.
Queensland.

1293 PHÆNICOPTERUS Erichs. Gen., p. 320.
Australia.

1294 RUFITARSIS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 241 ; 1878, XIII., p. 538.
Australia.

1295 SIDERALIS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 539.
W. Australia.

1296 SOCIUS Fvl. Ann. Mus. Civ. Gen., 1877, X., 247 ; 1878, XIII., p. 540.
Australia.

LEPTICANUS. Erichson.

1297 NOVÆ-HOLLANDIÆ Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 236 ; 1878, XIII., p. 537.
Victoria.

METOPONCUS. Kraatz.

1298 CYANIPENNIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 137 ; Fvl., Ann. Mus. Civ. Gen., 1877, X., p. 237.
Leptacinus cyanipennis Macleay.
Gayndah ; Queensland.

1299 LURIDIPENNIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 137; Fvl., Ann. Mus. Civ. Gen., 1877, X., p. 237.
Leptacinus luridipennis Macleay.
Gayndah; Queensland.

1300 PICEUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 138.
Xantholinus piceus Macleay.
Gayndah; Queensland.

DIOCHUS. Erichson.

1301 DIVISUS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 235.
New South Wales.

1302 OCTAVII Fvl. Ann. Mus. Civ. Gen., 1877, p. 235; 1878, XIII., p. 535.
Australia.

Sub-Family. PÆDERIDES.

LATHROBIUM. Gravenhorst.

1303 ANGUSTICEPS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 522.
Queensland.

1304 AUSTRALICUM Solsky. Bull. Soc. Nat. Mosc., 1864, p. 447.
Australia.

1305 BREVICEPS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 521.
Queensland.

1306 CRIBRUM Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 523; var: *rufiventre* Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 524.
Victoria; Queensland.

1307 FERREUM Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 288.
Australia.

1308 GRATELLUM Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 229; 1878, XIII., p. 522.
New South Wales.

1309 LIMBATUM Fvl. Ann. Mus. Civ. Gen, 1878, XIII., p. 524.
Queensland.

1310 LONGICEPS Fvl. Ann. Mus. Civ. Gen., 1877, X,, 330
N. S. Wales.

1311 MICROS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 523.
Rockhampton; Queensland.

1312 MUTATOR Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 525.
Victoria.

1313 NOTATICOLLE Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 229; 1878, XIII., p. 523.
Queensland.

1314 PENNATUM Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 522.
Queensland.

1315 PICEUM Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 144; Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 228.
Gayndah; Queensland.

1316 POLITULUM Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 144; Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 228.
Gayndah; Queensland.

HYPEROMA. Fauvel.

1317 LACERTINUM Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 532.
King George's Sound; W. Australia.

SUNIOPSIS. Fauvel.

1318 SINGULARIS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 530.
W. Australia.

SCIMBALIUM. Erichson.

1319 ARCUATUM Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 529.
Australia.

1320 AUSTRALE Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 231; 1878, XIII., p. 528.
Australia.

1321 DUPLOPUNCTATUM Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 527.
Victoria.

1322 FERRUGINEUM Fvl. Ann. Mus. Civ. Gen., 1878, XIII
p. 526.
Queensland.

1323 MICROCEPHALUM Fvl. Ann. Mus. Civ. Gen., 1877, X
p. 232; 1878, XIII., p. 527.
South Australia.

1324 OPACULUM Fvl. Ann. Mus. Civ., Gen., 1878, XIII., p. 530.
Queensland.

1325 RUFUM Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 529.
South Australia.

1326 SIMPLARIUM Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 528.
South Australia.

1327 SPARSICOLLE Fvl. Ann. Mus. Civ. Gen., 1878, XIII.,
p. 528.
South Australia.

DOLICAON. Castelnau.

1328 ELONGATULUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 143; Fvl., Ann. Mus. Civ. Gen., 1877, X., p. 225.
Gayndah; Queensland.

1329 NIGRIPENNIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 144; Fvl., Ann. Mus. Civ. Gen., 1877, X., p. 225.
Gayndah; Queensland.

1330 PARICOLOR Fvl. Ann. Mus. Civ. Gen.. 1878, XIII., p. 517.
Australia.

1331 QUADRATICOLLIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 143; Fvl., Ann. Mus. Civ. Gen., 1877, X., p. 225.
Gayndah; Queensland.

PINOBIUS. Macleay.

1332 MASTERSI Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 148; Fvl., Ann. Mus. Civ. Gen.. 1877, X., p. 225.
Gayndah; Queensland.

DICAX. Fauvel.

1333 ARCULUS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 520.
Victoria.

1334 CEPHALOTES Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 519.
Australia.

1335 LONGICEPS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 519.
N. S. Wales.

1336 RUBRIPENNIS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 519.
Victoria.

CRYPTOBIUM. Mannerheim.

1337 APICALE Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 143; Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 234; 1878, XIII., p. 534.
Gayndah; Queensland.

1338 FRACTUM Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 534.
Victoria.

1339 MASTERSI Macleay. Trans. Ent. Soc. N. S. Wales, 1871, II., p. 142; Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 233; 1878, XIII.,p. 534.
Gayndah; Queensland.

1340 PICEUM Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 533.
Queensland.

STILICUS. Latreille.

1341 OVICOLLIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 145; Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 217.
Gayndah; Queensland.

SCOPÆUS. Erichson.

1342 DIGITALIS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 515.
Victoria.

1343 ROTUNDICOLLIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 145; Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 218.
Gayndah; Queensland.

1344 RUFICOLLIS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 218.
Australia.

LITHOCHARIS. Lacordaire.

1345 IGNITA Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 221.
Australia.

1346 TRISTIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 144 ; Fvl., Ann. Mus. Civ. Gen., 1877, X., p. 221.
Gayndah ; Queensland.

DOMENE. Fauvel.

1347 AUSTRALIÆ Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 514.
Queensland.

SUNIUS. Stephens.

1348 AUSTRALASIÆ Fvl. Ann. Mus. Civ. Gen., 1877, X. p. 216 ; 1878, XIII., p. 513.
New South Wales.

1349 CYLINDRICUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 145 ; Fvl., Ann. Mus. Civ. Gen., 1877, X., p. 216 ; 1878, p. 513.
Gayndah ; Queensland.

1350 GUTTULA Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 217 ; 1878, XIII., p. 514.
New South Wales.

1351 PECTINATUS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 513.
New South Wales.

PÆDERUS. Fabricius.

1352 ANGULICOLLIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 146 ; Fvl., Ann. Mus. Civ., Gen., 1877, X., p. 224.
Gayndah ; Queensland.

1353 AUSTRALIS Guér. Voy. Coquille. Zool., II., p. 63, t. 1, f. 23
New South Wales.

1354 CINGULATUS Macleay. Trans Ent. Soc., N. S. Wales, 1871, II., p. 146 ; Fvl., Ann. Mus. Civ. Gen., 1877, X., p. 228.
Gayndah ; Queensland.

1355 cruenticollis Germ. Linn. Ent., 1848, III., p. 174.
South Australia.

1356 sparsus Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 516.
N. S. Wales.

1357 tenuicornis Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 224; 1878, XIII., p. 517.
Australia.

PALAMINUS. Erichson.

1358 Australiæ Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 508,
Queensland.

ŒDICHIRUS. Erichson.

1359 intricatus Fvl. Ann. Mus. Civ. Gen. 1877, X., p. 211.
Cape York; N. Australia.

1360 pæderoides Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 147; Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 211.
Gayndah; Queensland.

1361 rubricollis Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 508.
Australia.

PROCIRRUS. Erichson.

1362 Castelnaui Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 509.
Australia.

1363 Victoriæ Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 509.
Victoria.

PINOPHILUS. Gravenhorst.

1364 æneiventris Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 214; 1878, XIII. p. 511.
Australia.

1365 curticornis Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 215,
Queensland.

1366 grandiceps Macleay. Trans. Ent. Soc. N. S. Wales, 1871, II., p. 146; Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 212.
Gayndah; Queensland.

1367 MACLEAYI Duvivier.
brevis Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 147; Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 213.
Gayndah; Queensland.

1368 MARGINELLUS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 511.
Victoria.

1369 MASTERSII Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 146; Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 212.
Gayndah; Queensland.

1370 OPACUS Redt. Reise, Novara., 1868, Zool., II., Col. p. 30.
Sydney; N. S. Wales.

1371 RUBRIPENNIS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 511.
N. S. Wales.

1372 RUFITARSIS Fvl. Ann. Mus. Civ. Gen.. 1877, X., p. 214; 1878, XIII., p. 510.
Tasmania.

1373 TRAPEZUS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 510.
Victoria.

NOTOBIUM. Solsky.

1374 AUSTRALICUM Solsky. Bull. Mosc., 1864, II., p. 447.
Victoria.

Sub-Family. STENIDES.

STENUS. Latreille.

1375 ATROVIRENS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 503.
Queensland.

1376 CAVICEPS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 207; 1878, XII., p. 223.
Australia.

1377 CŒRULEUS Ch. Waterh. Ent. Month. Mag., XIV., p., 24; Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 209; 1878, XIII., p. 506.
N. S. Wales.

1378 CUPREIPENNIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871. II., p. 149; Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 209; 1878, XIII., p. 502.
Gayndah; Queensland.

1379 GAYNDAHENSIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 148; Fvl., Ann. Mus. Civ. Gen., 1877, X., p. 209.
Gayndah; Queensland.

1380 GUTTULIFER Ch. Waterh. Ent. Month. Mag., XIV., p. 24; Fvl., Ann. Mus. Civ. Gen., 1877, X., p. 209.
New South Wales.

1381 MACELLUS Fvl., Ann. Mus. Civ. Gen., 1878, XIII., p. 504.
King George's Sound; W. Australia.

1382 MACULATUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 148; Fvl., Ann. Mus. Civ. Gen., 1877, X., p. 208; 1878, XIII., p. 504.
Gayndah; Queensland.

1383 OBESULUS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 506.
Queensland.

1384 OLIVACEUS Macleay. Trans. Ent. Soc., New South Wales, 1871, II,, p. 148; Fvl., Ann. Mus. Civ. Gen., 1877, X., p. 209; 1878, XIII., p. 503.
Gayndah; Queensland.

1385 PUNCTICOLLIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 149; Fvl., Ann. Mus. Civ. Gen, 1877, X., p. 209; 1878, XIII., p. 502.
Gayndah; Queensland.

1386 PUSTULIFER Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 505.
New South Wales.

1387 SIMILIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 149; Fvl., Ann. Mus. Civ. Gen., 1877, X., p. 209.
Gayndah; Queensland.

1388 VIRIDI-ÆNEUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 149; Fvl., Ann. Mus. Civ. Gen., 1877, X., p. 209.
Gayndah; Queensland.

MEGALOPS. Erichson.

1389 DENTICOLLIS Fvl. Ann. Mus. Civ. Gen., 1878, p. 500.
Australia.

1390 NODIPENNIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 150; Fvl., Ann. Mus. Civ. Gen., 1877, X., p, 206.
Gayndah; Queensland.

Sub-Family. OXYTELIDES.

OSORIUS. Latreille.

1391 SANGUINIPENNIS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 192.
Australia.

BLEDIUS. Mannerheim.

1392 ATERRIMUS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 204; 1878, XIII., p. 499.
N. S. Wales.

1393 CAPITALIS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 204.
Queensland.

1394 CONVEXIFRONS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 498.
Swan River; W. Australia.

1395 HAMIFER Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 499.
W. Australia.

1396 MANDIBULARIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 150; Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 204.
Gayndah; Queensland.

1397 PHYTOSINUS Fvl. Ann. Mus. Civ. Gen, 1878, XIII., p. 499.
Australia.

SARTALLUS. Sharp.

1398 SIGNATUS Sharp. Ent. Month. Mag., 1871, VII., p. 217; Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 205.
South Australia.

OXYTELUS. Gravenhorst.

1399 APICALIS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 494.
Swan River; W. Australia.

1400 BRUNNIPENNIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 150; Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 199.
Gayndah; Queensland.

1401 COLLARIS Erichs. Gen., p. 789.
Tasmania.

1402 CRIBRICEPS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 496.
Melbourne; Victoria.

1403 DISCIPENNIS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 197.
Tasmania and N. S. Wales.

1404 FLAVIPES Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 494.
King George's Sound; W. Australia.

1405 IMPENNIS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 198; 1878, XIII., p. 493.
Victoria.

1406 IMPRESSIFRONS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 150; Fvl., Ann. Mus. Civ. Gen., 1877, X., p. 200.
Gayndah; Queensland.

1407 MELAS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 196; 1878, XIII., p. 492.
Tasmania.

1408 MYOPS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 199.
Cape York; N. Australia.

1409 OBSCURIFRONS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 494.
Australia.

1410 OCCIDENTALIS Fvl. Ann. Mus. Civ. Gen.. 1877, X., p. 199.
W. Australia.

1411 OCULARIS Fvl. Ann Mus. Civ. Gen., 1877, X., p. 198.
Australia.

1412 PICEICOLLIS Fvl. Ann. Mus. Civ. Gen., 1878, XII., p. 495.
New South Wales.

1414 RUBECULUS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 497.
Victoria.

1415 RUFINODIS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 493.
Australia.

1416 SCABRELLUS Fvl. Ann. Mus, Civ. Gen., 1878, XIII., p. 496.
Australia.

1417 SEMIRUFUS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 202; 1878, XIII., p. 493.
W. Australia.

1418 SPARSUS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 203; 1878, XIII., p. 493.
Victoria.

1419 STRIATELLUS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 49 7
W. Australia.

1420 SUBÆNEUS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 199.
W. Australia.

1421 VARIUS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 201.
Victoria.

1422 VULNERATUS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 197; 1878, XIII., p. 492.
Victoria.

TROGOPHLŒUS. Mannerheim.

1423 ANCEPS. Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 194.
Australia.

1424 CARBONARIUS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 490.
Victoria.

1425 PUNCTATUS Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 194; 1878, XIII., p. 490.
Australia.

SHARPIA. Fauvel.

1426 BANKSI Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 488
Victoria.

Sub-Family. OMALIDES.

AMPHICHROUM. Kraatz.

1427 AUSTRALE Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 191; 1878, XIII., p. 486.
N. S. Wales.

1428 CRIBRICEPS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 486.
South Australia.

1429 SPINIPES Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 487.
W. Australia.

OMALIUM. Gravenhorst.

1430 GAYNDAHENSE Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 151; Fvl. Ann. Mus. Civ. Gen., 1877, X., p. 190.
Gayndah; Queensland.

1431 PHIORINOIDES Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 485.
Victoria.

Sub-Family. PHLŒOCHARIDES.

PHLŒOCHARIS. Mannerheim.

1432 ANTIPODUM Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 483,
Australia.

Sub-Family. PIESTIDES.

ELEUSIS. Castelnau.

1433 AUSTRALIS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 482.
Queensland.

1434 PLANICOLLIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 151; Fvl., Ann. Mus. Civ. Gen., 1877, X., p. 186.
Isomalus planicollis Macleay.
Gayndah; Queensland.

LISPINUS. Erichson.

1435 SIDNEENSIS Fvl. Ann. Mus. Civ. Gen., 1878, XIII., p. 481
Sydney; N. S. Wales.

Family. PSEPHALIDÆ

Sub-Family. PSELAPHIDES.

NARCODES. King.

1436 varia King. Trans Ent. Soc., N. S. Wales, 1863, I. p. 38.
Pulchra King. Trans. Ent. Soc., N. S. Wales, 1863, p. 39; 1865, I., p. 299.
Parramatta; N. S. Wales.

CTENISTES. Reichenbach.

1437 impressus Sharp. Trans. Ent. Soc., Lond., 1874, p. 485.
W. Australia.

1438 Kreusleri King. Trans. Ent. Soc., N. S. Wales, 1866, I., p. 300.
Gawler; S. Australia.

1439 parvus Sharp. Trans. Ent. Soc., Lond., 1874, p. 486.
Victoria.

1440 simplex Sharp. Trans. Ent. Soc., Lond., 1874, p. 486.
Victoria.

1441 vernalis King. Trans. Ent. Soc., N. S. Wales, 1863, I., p. 40; 1864, I., p. 102.
hesperi King. Trans. Ent. Soc., N. S. Wales, 1863, I., p. 40.
Parramatta; N. S. Wales.

TMESIPHORUS. Leconte.

1442 formicinus Macleay. Trans. Ent. Soc., N. S. Wales, 1863, II., p. 370.
Mundarlo; N. S. Wales.

1443 Kingi Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 151.
Gayndah; Queensland.

1444 Macleayi King. Trans. Ent. Soc., N. S. Wales, 1863, p. 40; 1864, p. 102.
Illawarra, Parramatta, Petersham, &c.; N. S. Wales.

TYROMORPHUS. Raffray.

1445 nitidus Raff. Rev. d'Ent., 1883, II., p. 241, t. 5, f. 17-18.
Australia.

TYRUS. Aubé.

1446 bispinosus Westw. Trans. Ent. Soc., 1865, III., p. 271, t. XVI., f. 4.
Australia.
1447 formosus King. Trans. Ent. Soc., N. S. Wales, 1863, p. 41, t. 5, f. 4, a.
Parramatta; N. S. Wales.
1448 Howittii King. Trans. Ent. Soc., N. S. Wales, 1866, p. 301.
Melbourne; Victoria.
1449 humeralis Westw. Trans. Ent. Soc., 1856, III., p. 272, t. 16, f. 5.
Melbourne; Victoria.
1450 Mastersi Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 152.
Gayndah; Queensland.
1451 mirandus Sharp. Trans. Ent. Soc., 1874, p. 488.
Victoria.
1452 palpalis King. Trans. Ent. Soc., N. S. Wales, 1863, I., p. 42, t. 5, f. 5a.
Parramatta; N. S. Wales.
1453 piceus King. Trans. Ent. Soc., N. S. Wales, 1865, I., 301.
Parramatta, South Creek, Camperdown, &c.; N. S. Wales.
1454 speciosus King. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 168.
Clyde River; N. S. Wales.
1455 Victoriæ King. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 168.
Melbourne; Victoria.

TYRAPHUS. Sharp.

1456 BREVIS Sharp. Trans. Ent. Soc., Lond., 1874, p. 491.
W. Australia.

1457 MAJOR Sharp. Trans. Ent. Soc. Lond., 1874, p. 491.
Champion Bay; W. Australia.

1455 PLANUS Sharp. Trans. Ent. Soc. Lond., 1874, p. 489.
W. Australia.

RYTUS. King.

1459 CORNIGER King. Trans. Ent. Soc., N. S. Wales, 1865, I., p. 303.
Clyde River; N. S. Wales.

1460 EMARGINATUS King. Trans. Ent. Soc., N. S. Wales, 1865, I., p. 303.
Parramatta; N. S. Wales.

1461 PUNCTATUS King. Trans. Ent. Soc., N. S. Wales, 1865, I., p. 303, t. 7, f. 6.
subulatus King. Trans. Ent. Soc., N. S. Wales, 1863, I., p. 103.
Parramatta, South Creek, Prospect Hill, &c.; N. S. Wales,

1462 VICTORIÆ King. Trans. Ent. Soc., N. S. Wales, 1865, I., p. 304.
Melbourne; Victoria.

FARONUS. Aubé.

1463 PUNCTATUS King. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 168.
Currajong; N. S. Wales.

GONATOCERUS. Schaufuss.

1464 COMMUNIS Schauf. Soc. Ent. Belg., 1880, p. 30.
Australia.

PSELAPHUS. Aubé.

1465 ANTIPODUM Westw. Trans. Ent. Soc., Lond., 1856, III., p. 274, t. 16, f. 8.
Melbourne; Victoria.

1466 BREVIPALPIS Schauf. Soc. Ent., Belg., 1880, p. 8.
var. *simplicior* Schauf. Soc. Ent. Belg., 1880, p. 8.
Gawler; South Australia.

1467 CLAVATUS King. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 169.
Clyde River; N. S. Wales, Victoria and S. Australia.

1468 CLAVICORNIS Schauf. Soc. Ent. Belg., 1880, p. 7.
Gawler; S. Australia.

1469 GEMINATUS Westw. Trans. Ent. Soc., Lond., 1856, III., p. 273, t. 16, f. 9.
Melbourne, Victoria.

1470 LINEATUS King. Trans. Ent. Soc., N. S. Wales, 1862, I., p. 43.
Parramatta; N. S. Wales, Victoria and S. Australia.

1471 MUNDUS Sharp. Trans. Ent. Soc., Lond., 1874, p. 491.
Victoria.

1472 PUNCTATUS King. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 169.
Rockhampton; Queensland.

1473 TENUIS Sharp. Trans. Ent. Soc., Lond., 1874, p. 493.
Victoria.

GERALLUS. Sharp.

1474 NANUS Sharp. Trans. Ent. Soc., Lond., 1874, p. 494.
W. Australia.

1475 PERFORATUS Schauf. Soc. Ent., Belg., 1880, p. 34.
Tasmania.

1476 PORCELLUS Schauf. Soc. Ent., Belg., 1880, p. 33.
Australia.

1477 PUNCTIPENNIS Schauf. Soc. Ent., Belg., 1880, p. 33.
New South Wales.

1478 SUBASPER Schauf. Soc. Ent., Belg., 1880, p. 34.
Tasmania.

TYCHUS. Leach.

1479 HOWITTII King. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 170.
Melbourne; Victoria.

1480 NIGRICOLLIS King. Trans. Ent. Soc., N. S. Wales, 1863, I., p. 103.
Parramatta, Sydney, &c.; N. S. Wales.

1481 OBLIQUUS King. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 170.
Parramatta, Blue Mountains, &c.; N. S. Wales.

CURCULIONELLUS. Westwood.

1482 ANGULICOLLIS Westw. Trans. Ent. Soc. Lond., 1870, p. 127.
Cape York; N. Australia.

SINTECTUS. Westwood.

1483 CARINATUS Westw. Trans. Ent. Soc. Lond., 1870, p. 130.
Australia.

DURBOS. Sharp.

1484 PRISCUS Sharp. Trans. Ent. Soc. Lond., 1874, p. 495.
Champion Bay; W. Australia.

BATRISUS. Aubé.

1485 ANGULATUS Westw. Trans. Ent. Soc. Lond., 1856, III., p. 273, l. 16, f. 6-7.
Melbourne; Victoria.

1486 AUSTRALIS Erichs. Wiegm. Arch., 1842, I., p. 243.
Tasmania.

1487 BARBATUS King. Trans. Ent. Soc. N. S. Wales, 1862, I., p. 44, t. 5, f. 6, a.
Parramatta; N. S. Wales.

1488 CONSPICUUS King. Trans. Ent. Soc., N. S. Wales, 1863, I., p. 171.
Parramatta; N. S. Wales.

1489 CYCLOPS King. Trans. Ent. Soc., N. S. Wales, 1865, I., p. 306.
Ipswich; Queensland.

1490 EDWARDSI King. Trans. Ent. Soc., N. S. Wales, 1864, p. 172.
Victoria.

1491 ELIZABETHÆ King. Trans. Ent. Soc., N. S. Wales, 1863, p. 104.
Elizabeth Bay; Sydney.

1492 GIBBOSUS King. Trans. Ent. Soc., N. S. Wales, 1865, p. 307.
Parramatta; N. S. Wales.

1493 GIRAFFA Schauf. Soc. Ent., Belg., 1880, p. 31.
Australia.

1494 HAMATUS King. Trans. Ent. Soc, N. S. Wales, 1862, I., p. 45, l. 5, f. 6 c.
Parramatta and Blue Mountains, N. S. Wales.

1495 NOBILIS King. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 17.
Parramatta; N. S. Wales.

1496 TIBIALIS King. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 171.
Maitland; N. S. Wales.

1497 URSINUS Schauf. Soc. Ent., Belg., 1880, p. 31.
Australia.

BRYAXIS. Leach.

1498 ÆQUATA King. Trans. Ent. Soc., N. S. Wales, 1865, I., p. 310.
Elizabeth Bay; Sydney.

1499 AFFINIS Schauf. Soc. Ent., Belg., 1880, p. 25.
New South Wales.

1500 AMPLIVENTRIS Shauf. Soc. Ent., Belg., 1880, p. 29.
Sydney; N. S. Wales.

1501 ARMITAGEI King. Trans. Ent. Soc., N. S. Wales, 1863, p. 104.
Parramatta and Prospect; N. S. Wales.

1502 ATRA King. Trans. Ent. Soc., N. S. Wales, 1865, p. 309.
Dandenong Ranges; Victoria.

1503 ATRICEPS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 152.
Gayndah; Queensland.

1504 ATRIVENTRIS Westw. Trans. Ent. Soc., Lond., 1856, III., p. 270, t. 16, f. 3.
Melbourne ; Victoria.

1505 AURORA Schauf. Soc. Ent., Belg., 1880, p. 20.
New South Wales.

1506 BASALIS King. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 172.
Clyde River ; N. S. Wales.

1507 BISON Schauf. Soc. Ent., Belg., 1880, p. 23.
King George's Sound : W. Australia.

1508 BREVIS Schauf. Soc. Ent., Belg., 1880, p. 22.
Tasmania.

1509 BREVIUSCULA Schauf. Soc. Ent., Belg., 1880, p. 27.
Australia.

1510 CAPITATA King. Trans. Ent. Soc., N. S. Wales, 1865, p. 311.
Parramatta ; N. S. Wales.

1511 CHAMÆLEON Schauf. Soc. Ent., Belg., 1880, p. 23.
King's George's Sound ; W. Australia.

1512 CLAVATULA King. Trans. Ent. Soc., N. S. Wales, 1863, p. 104, t. 7, f. 12.
Sydney ; N. S. Wales.

1513 CONCOLOR Sharp. Trans. Ent. Soc., Lond., 1874, p. 496.
Victoria.

1514 DOMINORUM King. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 173.
Clyde River ; N. S. Wales.

1515 DIVERSICOLOR Schauf. Soc. Ent. Belg., 1880, p. 22.
King George's Sound ; W. Australia.

1516 ELECTRICA King. Trans. Ent. Soc., N. S. Wales, 1862, I., p. 48, t. 16, f. g. b.
Parramatta ; N. S. Wales.

1517 ELIZABETHÆ King. Trans. Ent. Soc., N. S. Wales, 1863, I., p. 105, t. 7, f. 8-9.
Elizabeth Bay ; Sydney.

1518 EUPLECTODES Sharp. Trans. Ent. Soc., Lond., 1874, p. 504.
W. Australia.
1519 EXIGUA King. Trans. Ent. Soc., N. S. Wales, 1862, I., p. 50.
Parramatta; N. S. Wales.
1520 FLAVIPES Schauf. Soc. Ent., Belg., 1880, p. 26.
Sydney; N. S. Wales.
1521 GEMINATA King. Trans. Ent. Soc., N. S. Wales, 1865, I., p. 311.
Parramatta; N. S. Wales.
1522 GLOBULIFER Schauf. Soc. Ent., Belg., 1880, p. 28.
Melbourne; Victoria.
1523 HIRTA Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 152.
Gayndah; Queensland.
1524 HORTENSIS King. Trans. Ent. Soc., N. S. Wales, 1862, I., p. 47.
Parramatta; N. S. Wales.
1525 HYALINA Schauf. Soc. Ent., Belg., 1880, p. 26.
Australia.
1526 HYALINIPENNIS Schauf. Soc. Ent., Belg., 1880. p. 25.
Tasmania.
1527 INSIGNIS King. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 172.
Currajong; N. S. Wales.
1528 ISIDORÆ Schauf. Soc. Ent., Belg., 1880, p. 24.
King George's Sound; W. Australia.
1529 LÆVICEPS Schauf. Soc. Ent., Belg., 1880. p. 27.
Australia.
1530 LATICLAVA Schauf. Soc. Ent., Belg., 1880, p. 19.
Tasmania.
1531 LUNATICA, King. Trans. Ent. Soc., N. S. Wales, 1862, I., p. 48, t. 16, f. 8 b.
Parramatta; N. S. Wales.
1532 MELANOCEPHALA Schauf. Soc. Ent., Belg., 1880, p. 18.
Tasmania.

1533 OPTATA Sharp. Trans. Ent. Soc., Lond., 1874, p. 496.
Victoria.

1534 PICTA Schauf. Soc. Ent., Belg., 1880, p. 21.
var., *frontalis* Schauf. Soc. Ent., Belg., 1880, p. 21.
var., *verticalis* Schauf. l.c., p. 22.
var., *ebenifer* Schauf. l.c., p. 22.
var., *æthiops* Schauf. l.c., p. 22.
Tasmania.

1535 PLECTA Sharp. Trans. Ent. Soc., Lond., 1874, p. 502.
Victoria.

1536 POLITA King. Trans. Ent. Soc., N. S. Wales, 186
p. 49; 1865, I., p. 309.
Parramatta; N. S. Wales.

1537 PUMILIO Schauf. Soc. Ent., Belg., 1880, p. 28.
Australia.

1538 QUADRICEPS Westw. Trans. Ent. Soc., Lond., 1856,
p. 270, t. 16, f. 2.
Melbourne; Victoria.

1539 RECTA Sharp. Trans. Ent. Soc., Lond., 1874, p. 496.
W. Australia.

1540 SPRETA Sharp. Trans. Ent. Soc., Lond., 1874, p. 501.
Victoria.

1541 SOBRINA Schauf. Soc. Ent., Belg., 1880, p. 19.
Tasmania.

1542 STRIGICOLLIS Westw. Trans. Ent. Soc., Lond., 1865,
p. 269, t. 16, f. 1.
Melbourne; Victoria.

1543 SULCATA Sharp. Trans. Ent. Soc., Lond., 1874, p. 503.
W. Australia.

1544 TALPA Schauf. Soc. Ent. Belg., 1880, p. 20.
Tasmania.

1545 TRANSVERSA King. Trans. Ent. Soc., N. S. Wales, 18
p. 311.
Parramatta; N. S. Wales.

1546 VICTORIÆ King. Trans. Ent. Soc., N. S. Wales, 1865, p. 310.
Victoria.

1547 VITREA Schauf. Soc. Ent. Belg., 1880, p. 19.
Tasmania.

SCHISTODACTYLUS. Raffray.

1548 PHANTASMA Raff. Rev. d'Ent., 1883, II., p. 244, pls., V., figs. 20-22 and IV., fig. 23.
King George's Sound, W. Australia.

CYATHIGER. King.

1549 PUNCTATUS King. Trans. Ent. Soc., N. S. Wales, 1865, I., p. 174, t. 14.
Petersham and Blue Mountains; N. S. Wales.

BYTHINUS. Leach.

1550 IMPRESSIFRONS King. Trans. Ent. Soc., N. S. Wales, 1865, I., p. 173.
Clyde River; N. S. Wales.

1551 NIGER King. Trans. Ent. Soc., N. S. Wales, 1866, I., p. 312.
Victoria.

EUPLECTUS. Leach.

1552 DEPRESSUS King. Trans. Ent. Soc., N. S. Wales, 1856, I., p. 313.
Currajong; N. S. Wales.

1553 EXCISUS King. Trans. Ent. Soc., N. S. Wales, 1866, I., p. 313.
Dandenong Ranges; Victoria.

1554 LINEARIS King. Trans. Ent. Soc.. N. S. Wales, 1863, I., p. 46, t. 5, f. 7, b.
Parramatta; N. S. Wales.

1555 ODEWAHNI King. Trans. Ent. Soc., N. S. Wales, 1866, I., p. 314.
Gawler; S. Australia.

1556 sculptus King. Trans. Ent. Soc., N. S. Wales, 1863, I., p. 49.
Parramatta; N. S. Wales.

1557 subterraneus King. Trans. Ent. Soc., N. S. Wales, 1866, I., p. 314.
Liberty Plains; N. S. Wales.

MARGARIS. Schaufuss.

1558 imperialis Schauf. Nung. Ot., Dresden, 1877, II., p. 454.
Rockhampton.

SOMATIPION. Schaufuss.

1559 globulifer Schauf. Nung. Ot. Dresden, 1877, II., p. 458.
King George's Sound, W. Australia.

Sub-Family. CLAVIGERIDES.

ARTICEROS. Dalman.

1560 angusticollis Westw. Trans. Ent. Soc., 1856, III., p. 275, t. 17, f. 1.
Victoria. Parramatta; N. S. Wales.

1561 auriflüus Schauf. Ann. Mus. Civ. Gen., 1883, XVIII., p. 194.
Melbourne; Victoria.

1562 Bostocki Pascoe. Proc. Ent. Soc., Lond., 1866, p. 15.
Swan River; W. Australia.

1563 breviceps King. Trans. Ent. Soc., N. S. Wales, 1869, II., p. 56.
Ropes Creek; N. S. Wales.

1564 brevipes Sharp. Trans. Ent. Soc., Lond., 1874, p. 512.
W. Australia.

1565 curvicornis Westw. Trans. Ent. Soc., Lond., 1856, III., p. 275, t. 17, f. 2.
Victoria.

1566 Deyrollei Sharp. Trans. Ent. Soc., Lond., 1874, p. 514.
Australia.

1567 DILATICORNIS Westw. Trans. Ent. Soc., Lond., 1856, III., p. 276, t. 17, f. 4.
Victoria.

1568 DUBOULAYI Waterh. Ent. Month. Mag., 1865, I., p. 149.
Swan River; W. Australia.

1569 FORTNUMI Hope. Trans. Ent. Soc. Lond., 1845, IV., p. 106, t. 7, f. 1; Lacord. Gen. Col., II., p. 182.
South Australia.

1570 GIBBULUS Sharp. Trans. Ent. Soc. Lond., 1874, p. 513.
W. Australia.

1571 KINGIUS Sharp Trans. Ent. Soc. Lond., 1874, p. 512.
W. Australia.

1572 ODEWAHNI Pascoe. Proc. Ent, Soc. Lond., 1866, p. 15.
S. Australia.

1573 PASCOEUS Sharp. Trans. Ent. Soc. Lond., 1874, p. 511.
W. Australia.

1574 REGIUS King. Trans Ent. Soc., N. S. Wales, 1869, II., p. 55.
Liverpool; N. S. Wales.

1575 SELYSI Schauf. Soc. Ent. Belg., 1880, p. 5.
Swan River; W. Australia.

1576 SETIPES Westw. Trans. Ent. Soc. Lond., 1865, III., p. 276, t. 17, f. 3.
Victoria. Gawler; S. Australia.

1577 SHARPI Masters.
tumidus Sharp. Trans. Ent. Soc. Lond., 1874, p. 511 (nom. præocc.)
West Australia.

1578 SPINIFER Sharp. Trans. Ent. Soc. Lond., 1874, p. 513.
N. W. Australia.

1579 TUMIDUS Westw. Trans. Ent. Soc. Lond., 1869, p. 318.
Swan River; W. Australia.

1580 WESTWOODII Sharp. Trans. Ent. Soc. Lond., 1874, p. 510.
W. Australia.

Family. PAUSSIDÆ.

ARTHROPTERUS. W. S. Macleay.

1581 **Adelaidæ** Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 347.
S. Australia.

1582 **angulatus** Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 346.
Rockhampton; Queensland.

1583 **angulicornis** Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 342.
Ipswich; Queensland.

1584 **angusticornis** Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 154.
Gayndah; Queensland.

1585 **bisinuatus** Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 341.
Lane Cove. near Sydney.

1586 **brevicollis** Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 351.
New South Wales.

1587 **brevis** Westw. Proc. Linn. Soc., Lond, 1850, II., p. 101; Ann. Nat. Hist., 1851, VII., p. 491.
New South Wales.

1588 **cylindricollis** Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 340.
Rockhampton; Queensland.

1589 **cylindricus** Masters.
sub-cylindricus Westw. Thesaurus. Ent. Oxon., 1874, p. 76, t. 15, f. 2 (nom. præocc.)
Australia.

1590 **Darlingensis** Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 349.
Darling River; N. S. Wales.

1591 DENUDATUS Westw. Proc. Linn. Soc., Lond., 1849, II., p. 56.
Australia.

1592 DEPRESSUS Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 350.
Tweed River; N. S. Wales.

1593 ELONGATULUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 154.
Gayndah; Queensland.

1594 FOVEICOLLIS Macleay. Trans. Ent. Soc., N. S. Wales, II., p. 347.
Near Sydney; N. S. Wales.

1595 HIRTUS Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 349.
Monaro; N. S. Wales.

1596 Hopei Westw. Arcan. Ent., II., p. 8, t. 50, f. 5.
S. Australia.

1597 Howittii Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 351.
Victoria.

1598 Howittensis Masters.
Howittii Westw. Thesaurus. Ent. Oxon., 1874. p. 75, t. 15, f. 3 (nom. præocc.)
Melbourne; Victoria.

1599 HUMERALIS Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 344.
Wellington and Dabee; N. S. Wales.

1600 LATIPENNIS Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 352.
Flinders Range; S. Australia.

1601 Macleayi Don. Ins. Nov. Holl., t. 3; Westw. Arcan Ent., II., p. 8, t. 50, f. 4.
N. S. Wales.

1602 MASTERSI Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 153.
Gayndah; Queensland.

1603 MELBOURNII Westw. Thesaurus. Ent. Oxon., 1874, p. 77, t. 15, f. 5.
Melbourne; Victoria.

1604 MONTANUS Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 343.
Monaro; N. S. Wales.

1605 NIGRICORNIS Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 343.
Wide Bay; Queensland.

1606 ODEWAHNII Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 348.
S. Australia.

1607 OVICOLLIS Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 345.
S. Australia.

1608 PARALLELOCERUS Westw. Proc. Linn. Soc., Lond., 1850, II., p. 100; Ann. Nat. Hist., 1851, VII., p. 491.
Australia.

1609 PICIPES Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 343.
South Country, near Yass; N. S. Wales.

1610 POLITUS Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 352.
Liverpool Plains, N. S. Wales.

1611 PUNCTATISSIMUS Westw. Thesaurus. Ent. Oxon., 1874, p. 75, t. 15, f. 3.
Adelaide; S. Australia.

1612 PUNCTICOLLIS Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 347.
Liverpool Plains; N. S. Wales.

1613 QUADRICOLLIS Westw. Thesaurus. Ent. Oxon., 1874, p. 75, t. 15, f. 8.
Adelaide; S. Australia.

1614 Riverinæ Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 342.
Lower Murrumbidgee; N. S. Wales.

1615 Rockhamptonensis Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 350.
Rockhampton; Queensland.

1616 scutellaris Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 348.
South country; N. S. Wales.

1617 subampliatus Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 344.
Bombala, Monaro District; N. S. Wales.

1618 subcylindricus Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 346.
Bogolong, near Yass; N. S. Wales.

1619 subsulcatus Westw. Proc. Linn. Soc., Lond., 1849, II., p. 56.
Australia.

1620 Turneri Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 349.
Lane Cove, near Sydney; N. S. Wales.

1621 Waterhousei Macleay. Trans. Ent. Soc., N. S. Wales, 1873, II., p. 341.
S. Australia.

1622 Westwoodii Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 153.
Gayndah; Queensland.

1623 Wilsoni Westw. Proc. Linn. Soc., Lond., 1849, II., p. 56.
S. Australia.

1624 Wyanamattæ Macleay. Trans. Ent. Soc., N. S. Wales, II., p. 345.
Camden; N. S. Wales.

PHYMATOPTERUS. Westwood.

1625 **Macleayi** Westw. Trans. Ent. Soc., Lond., II., p. 95, t. 10, f. 7.
distinctus Thoms. Mus. Scient.. 1860, II., p. 69.
Australia.

1626 **piceus** Westw. Ent. Mag., V., p. 503; Arcan. Ent., I., p. 9, t. 50, f. 3; Lacord., Gen. Atl., t. 14, f. 1.
New South Wales.

Family. SCYDMÆNIDÆ

SCYDMÆNUS. Latreille.

1627 **corticis** King. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 94.
Parramatta; N. S. Wales.

1628 **gulosus** King. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 94.
Sydney, Parramatta, Camden, &c.; N. S. Wales.

1629 **Kingi** Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 155.
Gayndah; Queensland.

1630 **neglectus** King. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 95.
Parramatta; N. S. Wales.

1631 **optatus** Sharp. Trans. Ent. Soc., Lond., 1874, p. 515.
W. Australia.

1632 **Parramattensis** King. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 95, t. 7, f. 5.
Parramatta; N. S. Wales.

HETEROGNATHUS. King.

1633 **Armitagei** King. Trans. Ent. Soc., N. S. Wales. 1864, I., p. 98.
Pennant Hills; N. S. Wales.

1634 ASSIMILIS King. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 97.
Parramatta; N. S. Wales.

1635 CARINATUS King. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 97.
Parramatta; N. S. Wales.

1636 GENICULATUS King. Trans. Ent. Soc., N. S. Wales, 1864, I, p. 98.
South Creek; N. S. Wales.

1637 GRACILIS King. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 97, t. 7, f. 3.
Parramatta, South Creek, Brownlow Hill, &c.; N. S. Wales.

1638 MACLEAYI King. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 99.
Illawarra; N. S. Wales.

1639 PRINCEPS King. Trans. Ent. Soc., N. S. Wales; 1864, I., p. 98.
Parramatta, Lane Cove, &c.; N. S. Wales.

PHAGONOPHANA. King.

1640 KINGI King. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 92, t. 5, f. A, 1-4.
N. S. Wales and Queensland.

SCYDMÆNILLA. King.

1641 PUSILLA King. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 93, t. 6, f. b., 1-2.
Parramatta; N. S. Wales.

PSEPHAROBIUS. King.

1642 ELONGATUS King. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 94, t. 6, f. c. 1-2.
Parramatta; N. S. Wales.

MEGALADERUS. Stephens.

1643 INCONSPICUUS King. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 96, t. 6, f. 1-3.
Parramatta ; N. S. Wales.

Family. SILPHIDÆ.

Sub-Family. SILPHIDES.

NECRODES. Leach.

1644 OSCULANS Vigors. Zool. Journ., 1825, I., p. 537, t. 20, f. 12.
bifasciatus Spin. Dej. Cat., 3 ed., p. 132,
Upper Dawson River ; Queensland.

PTOMAPHILA. Hope.

1645 LACHRYMOSA Schreib. Trans. Linn. Soc., 1802, VI., p. 194, t. 20, f. 5.
Australia ; (widely distributed.)

1646 PERLATA Kraatz. Deutsche. Ent. Zeit., 1876, p. 356 ; Sturm, Cat., 1843, p. 87.
N. S. Wales and Queensland.

DIETTA. Sharp.

1647 SPERATA Sharp. Ent. Month. Mag., 1876, XIII., p. 78.
N. W. Australia.

CHOLEVA. Latreille.

1648 AUSTRALIS Erichs. Wiegm. Arch., 1842, I., p. 343 ; Murray, Mon., p. 461.
Catops Australis Erichs.
Tasmania.

1649 OBSCURUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871 II., p. 155.
Catops obscurus Macleay.
Gayndah ; Queensland.

Family. TRICHOPTERYGIDÆ.

ACTINOPTERYX. Matthews.

1650 AUSTRALIS Matthews. Cist. Ent., 1872, V., p. 93.
Swan River ; W. Australia.

PTILIUM. Gyllenhall.

1651 SIMSONI Mots. Cist. Ent., 1878, II., p. 327.
Tasmania.

Family. SCAPHIDIDÆ.

SCAPHIDIUM. Olivier.

1652 ATRIPENNE Gestro. Ann. Mus. Genov., 1879, XIV., p. 561.
Cape York ; N. Australia.

1653 BIMACULATUM Macleay. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 119.
Port Denison ; Queensland.

1654 CORONATUM Reitter. Verh. Ver. Brünn, 1880, XVIII. p. 40.
Australia.

1655 EXORNATUM R. Oberthur. Col. Nov., 1883, I., p. 6.
Clarence River ; N. S. Wales.

1656 MASTERSI Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 156.
Gayndah ; Queensland.

1657 PUNCTIPENNE Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 156.
Gayndah ; Queensland.

1658 QUADRIPUSTULATUM Oliv. Ent., II., 20, p. 4, t. 1, f. 2 ; Fab., Syst. El., II., p. 575.
N. S. Wales, Victoria, Tasmania.

SCAPHISOMA. Leach.

1659 **Albertisi** Reitter. M T. Münch. Ent. Ver., 1881, V., p. 141.
Australia.

1660 **bifasciatum** Reitter. M T. Münch. Ent. Ver., 1881, V., p. 140.
Australia.

1661 **Gestroi** Reitter. M T. Münch. Ent. Ver., 1881, V., p. 140.
Australia.

1662 **politum** Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 156,
Gayndah ; Queensland.

1663 **punctipenne** Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 156.
Gayndah ; Queensland.

Family. HISTERIDÆ.

Sub-Family. HOLOLEPTIDES.

HOLOLEPTA. Paykull.

1664 **Australis** Mars. Mon., 1853, p. 146, t. 4, f. 4.
King George's Sound, &c. ; W. Australia.

1665 **flagellata** Kirby. Trans. Linn. Soc., Lond., XII., p. 395.
Australia.

1666 **Mastersi** Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 157.
Gayndah ; Queensland.

1667 **Sidnensis** Mars. Mon., 1860, p. 587, t. 2, f. 1.
Sydney, &c. ; N. S. Wales.

APOBLETES. Marseul.

1668 **errans** Mars. Mon., 1860, p. 865, t. 2, nr., 10, f. 11.
Tasmania.

PLATYSOMA. Leach.

1669 Bakewellii Mars. Abeille, 1864, I., p. 309.
Australia.

1670 Bonvouloiri Mars. Mon., 1861, p. 147, t. 3, nr., 11, f. 7.
Australia.

1671 bifossopygum Mars. Ann. Soc. Ent. Belg., XIII., p. 69.
Australia.

1672 Clarenciæ Mars. Ann. Ent. Belg., 1870, XIII., p. 72.
Clarence River; N. S. Wales.

1673 comes Mars. Ann. Mus. Genov., 1879, XIV., p. 261.
Cape York N. Australia.

1674 completum Mars. Ann. Ent., Belg., 1870, XIII., p. 71.
Pine Mountains; Queensland.

1675 contiguum Mars. Abeille, 1864, I. p. 303.
Australia.

1676 contritum Mars. Ann Mus. Genov, 1879, XIV., p. 270.
Australia.

1677 convexiusculum Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 157.
Gayndah; Queensland.

1678 Dahdah Mars. Mon., 1861, p. 148, t. 3, nr. 11, f. 8.
Australia.

1679 discrepans Mars. Ann. Mus. Genov., 1879, XIV., p. 269.
Australia.

1680 Georgii Mars. Ann. Ent., Belg., 1870, XIII., p. 67.
King George's Sound; W. Australia.

1681 læve Mars. Mon., 1853, p. 263, t. 7, f. 8.
Tasmania.

1682 latisternum Mars. Mon., 1853, p. 262, t, 7, f. 7.
Tasmania.

1683 planiceps Macleay Trans. Ent. Soc., N. S. Wales, 1871, II., p. 157.
Gayndah; Queensland.

1684 RETROSPECTUM Mars. Ann. Mus., Genov., 1879, XIV, p. 268.
Australia.

1685 STRANGULATUM Mars. Ann. Ent., Belg., 1870, XIII., p. 67.
Australia.

1686 STRIATIPECTUS Mars. Ann. Ent., Belg., 1870, XIII., p. 67.
Melbourne; Victoria.

1687 SUBDEPRESSUM Macleay. Trans. Ent. Soc., N. S. Wales, 1870, II., p. 157.
Gayndah; Queensland.

Sub-Family. HISTERIDES.

PAROMALUS. Erichson.

1688 HONORATUS Mars. Ann Mus. Genov.. 1879, XIV., p. 2[illegible]77
Australia.

1689 MILITARIS Mars. Ann. Ent. Belg., 1870, XIII., p. 98.
Australia.

1690 UMBILICATUS Mars. Ann. Ent. Belg., 1870, XIII., p. 97.
Sydney; N. S. Wales.

1691 VICTORIÆ Mars. Ann. Ent. Belg., 1870, XIII., p. 97.
Victoria.

EPIERUS. Erichson.

1692 PARRA Mars. Ann. Ent. Belg., 1870, XIII., p. 92.
Australia.

CHLAMYDOPSIS, Westwood.

1693 DUBOULAYI Westw. Trans. Ent. Soc. Lond., 1869, p. 31
Champion Bay; W. Australia.

1694 INQUILINA Lewis. Ann. Mag. Nat. Hist., 1885, p. 472[illegible].
Australia.

1695 STRIATELLA Westw. Trans. Ent. Soc. Lond., 1869, p. 318.
Swan River; W. Australia.

TERETRIUS. Erichson.

1696 Melburnius Mars. Ann. Ent. Belg., 1870, XIII., p. 121.
Victoria, and N. S. Wales.

ACRITUS. Le Conte.

1697 hœdillus Mars. Ann. Ent. Belg., 1870, XIII.. p. 120.
Australia.

TRYPANÆUS. Erichson.

1698 Somerseti Mars. Ann. Mus. Genov., 1879, XIV., p. 281.
Cape York ; N. Australia.

TRIBALLUS. Erichson.

1699 Kœnigius Mars. Mon, Abielle, 1864, p. 334.
Cape York ; N. Australia.

SAPRINUS. Erichson.

1700 ater Macleay. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 118.
Port Denison ; Queensland.

1701 Australis Boisd. Voy. Astrol. Col., 1835, p. 148 ; Dej. Cat., 3 ed., p. 141.
Tasmanicus Mars. Mon., 1855, p. 386, t. 16, f. 27.
Australia.

1702 cyanellus Mars. Mon., 1855, p. 387, t. 16, f. 28.
Australia.

1703 cyaneus Fabr. Syst. Ent., I., p. 52 ; Mars. Mon., 1855, p. 385, t. 16, f. 26, var. *speciosus* Boisd. Voy. Astrol. Col., p. 148 ; Dej., Cat., 3 ed., p. 141.
Swan River ; W. Australia.

1704 Gayndahensis Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 158.
Gayndah ; Queensland.

1705 irinus Mars. Mon., 1862, p. 443, t 12, f. 5
Australia.

1706 LÆTUS Erichs. Jahrb., 1834, p. 179; Mars., Mon., 1855, p. 388, t. 16, f. 29; 1862, p. 444, t. 12, f. 6.
cyaneus Payk. Mon., p. 56, t. 5, f. 2.
Tasmania.

1707 MASTERSI Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 168.
Gayndah; Queensland.

1708 RUPICOLA Mars. Ann. Ent. Soc., Belg., 1870, XIII., p. 118.
Murray River.

1709 VIRIDICUPREUS Blanch. Voy. Pole. Sud., p. 57, t. 4, f. 10.
Raffles Bay; N. Australia.

GNATHONCUS. Jacquelin Duval.

1710 INCISUS Erichs. Wiegm. Arch., 1842, I., p. 152.
incisisternus Mars. Mon., 1862, p. 497, t. 17, IV., f. 1.
Tasmania.

ABRÆUS. Leach.

1711 AUSTRALIS Macleay. Trans. Ent. Soc., N. S. Wales, 187 II., p. 159.
Gayndah; Queensland.

Family. PHALACRIDÆ.

LITOCHRUS. Erichson.

1712 BRUNNEUS Erichs. Wiegm. Arch., 1842, I., p. 239.
Tasmania.

Family. NITIDULIDÆ.

BRACHYPTERUS. Kugelann.

1713 METALLICUS Reitter. Verh. Ver. Brünn., 1874, p. 509.
Australia.

1714 TESTACEUS Bohem. Res. Eugen., 1858, p. 39.
Sydney; N. S. Wales.

BRACHYPEPLUS. Erichson.

1715 AURITUS Murray. Mon., p. 288, t. 34, f. 10.
Sydney; N. S. Wales

1716 BASALIS Erichs. Wiegm. Arch., 1842, I., p. 149.
Tasmania.

1717 BINOTATUS Murray. Mon., p. 290, t. 24, f. 5.
Victoria.

1718 BLANDUS Murray. Mon., p. 291.
Victoria.

1719 CASTANIPES Murray. Mon., p. 293.
Melbourne; Victoria.

1720 HAAGI Reitter. Verh. z-b.. Wien., 1877, XXVII., p. 165.
Queensland.

1721 MACLEAYI Murray. Mon., p. 292.
N. S. Wales.

1722 MURRAYI Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 159.
Gayndah; Queensland.

1723 PLANUS Erichs. Wiegm. Arch., 1842, I., p. 149.
Tasmania.

IDÆTHINA. Reitter.

1724 DEYROLLEI Reitter. Verh. Ver. Brünn, 1875, XIII., p. 108.
Australia.

MACRURA. Reitter.

1725 BRUNNESCENS Reitter. Verh. Ver. Brünn, 1875, XIII., p. 110.
Australia.

1726 DENSITA Reit. Verh. Ver. Brünn, 1875, XIII., p. 110.
Australia.

1727 NIGRA Reitter. Verh. Ver. Brünn, 1873, XIII., p. 81.
Australia.

CARPOPHILUS. Stephens.

1728 ATERRIMUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 161.
Gayndah; Queensland.

1729 AUSTRALIS Murray. Mon., p. 376.
Melbourne; Victoria.

1730 BAKEWELLI Murray. Mon. p. 366.
Melbourne; Victoria.

1731 CONVEXIUSCULUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II, p. 159.
Gayndah; Queensland.

1732 EXCELLENS Reitter. Verh. Ver. Brünn, 1875, XIII., p. 101.
Australia.

1733 FRIVOLUS Murray. Mon., p. 392.
Melbourne; Victoria.

1734 GENTILIS Murray. Mon., p. 392.
Victoria.

1735 LURIDIPENNIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 160.
Gayndah; Queensland.

1736 OBSCURUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 160.
Gayndah; Queensland.

1737 PILIPENNIS Macleay. Trans. Ent. Soc., N. S. Wales., 1871, II., p. 160.
Gayndah; Queensland.

1738 PLANATUS Murray. Mon., p. 353.
Victoria.

NITIDULA. Fabricius.

1739 CONCOLOR Macleay. Trans. Ent. Soc,, N. S. Wales, 1871, II., p. 162.
Gayndah; Queensland.

1740 LATENS Blanch. Voy. Pole. Sud., 1853, IV., p. 56, t. 4, f. 8.
Australia.

LASIODACTYLUS. Perty.

1741 ALBERTISI Reitter. Ann. Mus. Genov., 1880, XV., p. 457.
Australia.

1742 MARGINATUS Reitter. Verh. Ver. Brünn., 1873, XII., p. 92.
Australia.

1743 NOTABILIS Olliff. The Entom., 1883, XVI., p. 99.
Cape York; N. Australia.

STAUROGLOSSICUS. Murray.

1744 TERMINALIS Murray. Mon., p. 399.
Victoria.

CRYPTARCHA. Shukhard.

1745 AUSTRALIS Reitter. Verh. Ver. Brünn., 1873, XII., p. 148.
Australia.

1746 FLAVIPENNIS Reitter. Verh. Ver. Brünn., 1875, XIII. p. 121.
Moreton Bay; Queensland.

1747 FLAVOGUTTATA Reitter. Verh. Ver. Brünn., 1875, XIII., p. 121.
Moreton Bay; Queensland.

1748 LÆVIGATA Reitter. Verh. Ver. Brünn., 1875, XIII., p. 120.
Moreton Bay; Queensland.

1749 NITIDISSIMA Reitter. Verh. Ver. Brünn., 1873, XII., p. 156,
Australia.

SORONIA. Erichson.

1750 AMPHOTIFORMIS Reitter. Verh. Ver. Brünn, 1880, XVIII., p. 1.
Adelaide; S. Australia.

1751 SUPERBA Reitter. Verh. Ver. Brünn, 1873, XII., p. 48.
Australia.

1752 VARIEGATA Macleay. Trans. Ent. Soc., N. S. Wales., 1871, II., p. 161.
Gayndah; Queensland.

THALYCRA. Erichson.

1753 AUSTRALIS Germ. Linn. Ent., 1848, III., p. 187.
S. Australia.

PRIA. Stephens.

1754 RUBICUNDA Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 161.
Gayndah; Queensland.

CYCHRAMPTODES. Reitter.

1755 MURRAYI Reitter. Deutsche, Ent. Zeit., 1878, p. 383.
Adelaide; S. Australia.

HAPTONCURA. Reitter.

1756 IMPERIALIS Reitter. M T. Münch. ent. Ver., 1877, I., p. 128.
Australia.

1757 LILIPUTANA Reitter. Ann. Mus. Genov., 1880, XV., p. 456.
Australia.

1758 SUBQUADRATA Reitter. M T. Münch. ent. Ver., 1877, I., p. 22.
Cape York; N. Australia.

PROMETOPIA. Erichson.

1759 QUADRIPUNCTATA Reitter. Verh. Ver. Brünn, 1880, XVIII., p. 127.
Cape York; N. Australia.

CIRCOPES. Motschulsky.

1760 ADELOPIFORMIS Reitter. Ann. Mus., Genov., 1880, XV., p. 458.
Australia.

GAULODES. Erichson.

1761 COSTATUS Erichs. Germ. Zeitschr., IV., p. 316.
Australia.

POCADIUS. Erichson.

1762 PILISTRIATUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 162.
Gayndah; Queensland.

CYCHRAMUS. Kugelann,

1763 NIGER Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 163.
Gayndah ; Queensland.

IPS. Fabricius.

1764 JANTHINUS Reitter. M T. Münch., Ent., Ver., 1877, I., p. 130.

1765 POLITUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 163.
Gayndah ; Queensland.

AMPHICROSSUS. Erichson.

1766 SIMPLEX Reitter. Ann. Mus. Genov., 1880, XV., p. 458.
Australia.

1767 SUBOPACUS Reitter. Ann. Mus. Genov., 1880, XV., p. 458.
Australia.

PALLODES. Erichson.

1768 LIMBICOLLIS Reitter. Verh. Ver. Brünn., 1880, XVIII., p. 4.

Family. TROGOSITIDÆ.

EGOLIA. Erichson.

1769 VARIEGATA Erichs. Wiegm, Arch., 1842, I., p. 151, t. 5, f. 6 ; Lacord. Gen. Atl.. t. 19, f. 1.
Tasmania.

TROGOSITA. Olivier.

1770 MAURITANICA Linné. Syst. Nat., I., 2, p. 674.
Australia. (Introduced.)

LEPERINA. Erichson.

1771 ADUSTA Pascoe. Journ. of Ent., 1860, I. (2), p. 100.
Victoria and South Australia.

1772 BURNETTENSIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 164.
Gayndah; Queensland.

1773 CIRROSA Pascoe. Journ. of Ent., 1860, 1. (2), p. 100.
Southern parts of Queensland.

1774 DECORATA Erichs. Wiegm. Arch., 1842, I., p. 150; Lacord. Gen. Atl., t. 19, f. 5.
Tasmania and Victoria.

1775 FASCICULATA Redtenb. Reis. Novar., 1867, II., p. 37, t. 2, f. 3.
Sydney; N. S. Wales.

1776 GAYNDAHENSIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 164.
Gayndah; Queensland.

1777 LACERA Pascoe. Journ. of Ent., 1860, I., p. 101.
Victoria.

1778 MASTERSI Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 163.
Gayndah; Queensland.

1779 OPATROIDES Léveillé. Ann. Mus., Genov., 1884, Lve. (2), p. 637.
Australia.

1780 TURBATA Pascoe. Journ. of Ent., 1863, II., p. 29.
New South Wales.

NEASPIS. Pascoe.

1781 SCULPTURATA Reitter. Deutsche. Ent. Zeit, 1876, IV. p. 74.
Melbourne; Victoria.

1782 SUBTRIFASCIATA Reitter. Deutsche. Ent. Zeit., 1876, IV., p. 73.
Australia.

1783 VILLOSA Pascoe. Ann. Nat. Hist., 1872 (4), X., p. 318
Australia.

PELTIS. Geoffroy.

1784 MONILIATA Pascoe. Ann. Nat. Hist., 1872 (4), X., p. 318.
Australia.

ANCYRONA. Reitter.

1785 GESTROI Reitter. Ann. Mus., Gen., 1880, XV., p. 459.
Australia.

PELTONYZA. Reitter.

1786 DEYROLLEI Reitter. Deutsche Ent. Zeit., 1876, IV., p. 72.
Australia.

Family. COLYDIDÆ.

SPARACTUS. Erichson.

1787 INTERRUPTUS Erichs. Weigm. Arch., 1842, I., p. 215.
Tasmania.

DITOMA. Herbst.

1788 COSTATA Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 165.
Gayndah; Queensland.

1789 SERRICOLLIS Pascoe. Jour. of Ent., 1860, I., 2, p. 101.
Australia.

MERYX. Latreille.

1790 AREOLATA Pascoe. Jour. of Ent., 1860, I., p. 92, t. 7, f. 4.
Tasmania.

1791 ILLOTA Pascoe. Journ. of Ent., 1860, I., p. 99, et., 302.
Australia.

1792 RUGOSA Latrl. Gen. Crust., III., p. 17; IV., t. 11, f. 1.
Tasmania, Victoria and N. S. Wales.

HOLOPLEURIDIA. Reitter.

1793 IMPERIALIS Reitter. Stett. Ent. Zeit., 1877, XXXVIII., p. 325.
Cape York; N. Australia.

CEBIA. Reitter.

1794 SCABROSA Reitter. Stett., Ent. Zeit., 1877, XXXVIII. p. 329.
Cape York; N. Australia.

ILLESTUS. Reitter.

1795 Grouvellii Reitter. M. T. Münch. Ent. Ver., 1877, I., p. 133.
Australia.

1796 productus Reitter. M T. Münch. Ent. Ver., 1877, I., p. 134.
Australia.

1797 repandus Reitter. Stett. Ent. Zeit., 1877, XXXVIII., p. 329.
Cape York; N. Australia.

DERETAPHRUS. Newman.

1798 Bakewellii Pascoe. Jour. of Ent., 1862, I., p. 463.
N. S. Wales.

1799 colydioides Pascoe. Journ. of Ent., 1862, I., p. 463.
N. S. Wales.

1800 Erichsoni Newm. Zoologist., 1855, App., p. 211.
S. Australia and Victoria.

1801 fossus Newm. The Entomol., 1842, p. 403.
Australia.

1802 granulipennis Reitter. Stett. Ent. Zeit., 1877, XXXVIII., p. 342.
N. S. Wales.

1803 ignarius Pascoe. Journ. of Ent., 1862, I., p. 462.
N. S. Wales.

1804 Pascoei Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 165.
Gayndah; Queensland.

1805 piceus Germ. Linn. Ent., 1848, III., p. 223; Lacord. Gen. Atl., t. 20, f. 3.
S. Australia.

1806 puteus Newm. The Entomol., 1842, p. 404.
Australia.

1807 viduatus Pascoe. Journ. of Ent., 1862, I., p. 404.
S. Australia.

1808 Wollastoni Newm. Zoologist., 1855, App., p. 210.
Moreton Bay; Queensland.

BOTHRIDERES. Erichson.

1809 anaglypticus Germ. Linn. Ent., 1848, III., p. 223.
S. Australia.

1810 equinus Pascoe. Journ. of Ent., 1862, I., p. 464.
Melbourne; Victoria.

1811 illusus Newm. The Entomol., 1842, p. 404.
Melbourne; Victoria.

1812 Kreffti Macleay Trans. Ent. Soc., N. S. Wales, 1871, II., p. 166.
Gayndah; Queensland.

1813 lobatus Pascoe. Journ. of Ent., 1862, I., p. 466.
Sydney; N. S. Wales.

1814 Mastersi Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 161.
Gayndah; Queensland.

1815 merus Pascoe. Journ. of Ent., 1862, I., p. 466.
Melbourne; Victoria.

1816 musivus Pascoe. Journ. of Ent., 1862, I., p. 465.
Victoria.

1817 Pascoei Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 166.
Gayndah; Queensland.

1818 rectangularis Macleay. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 119.
Port Denison: Queensland.

1819 servus Pascoe. Journ. of Ent., 1862, I., p. 466.
Melbourne; Victoria.

1820 suturalis Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 167.
Gayndah; Queensland.

1821 tæniatus Pascoe. Journ. of Ent., 1862, 1., p. 465.
Victoria.

1822 VERSUTUS Pascoe. Journ. of Ent., 1862, I., p. 467.
Melbourne; Victoria.

1823 VITTATUS Newm. The Entomol., 1842, p. 404.
Melbourne; Victoria.

PATHODERMUS. Fairmaire.

1824 RUFOSQUAMOSUS Fairm. Ann. Soc. Ent. Fr., 1881 (6), I., p. 81.
Queensland.

DASTARCUS. Reitter.

1825 DECORUS Reitter. Stett. Ent. Zeit., 1877., XXXVIII., p. 349.
Cape York; N. Australia.

NEPHARIS. Castelnau.

1826 ALATA Casteln. Rev. et Mag. de Zoologie., September, 1869, p. 356, t. 18, f. 4-5.
Hiketes thoracicus King. Trans. Ent. Soc., N. S. Wales, November 1869, II., p. 78.
King George's Sound; W. Australia.

1827 COSTATUS King. Trans. Ent. Soc., N. S. Wales, 1869. II., p. 77.
Liverpool; N. S. Wales.

PENTHELISPA. Pascoe.

1828 FULIGINOSA Erichs. Wiegm. Arch., 1842, I,, p. 215, t. 5, f. 4.
Tasmania.

1829 OBSCURA Pascoe. Journ. of Ent., 1862, I., p. 468.
Melbourne; Victoria.

1830 SECUTA Pascoe. Journ. of Ent., 1862, I., p. 467.
Melbourne; Victoria.

Family. RHYSODIDÆ.

RHYSODES. Dalman.

1831 LIGNARIUS Olliff. Proc. Linn. Soc., N. S. Wales, 1885 (3), X., p. 471.
Lambing Flat; N. S. Wales.

Family. CUCUJIDÆ.

Sub-Family. PASSANDRIDES.

PASSANDRA. Dalman.

1832 DEYROLLEI Grouvelle. Bull. Soc. Ent. Fr., 1885 (6), V. p. XXXI.
Australia.

1833 MARGINATA Grouv. Bull. Soc. Ent. Fr. 1877 (5), VII., p. CLIX.; Ann. Soc. Ent. Fr. 1878 (5), VIII., p. 261, t. 8, f. 2.
Australia.

HECTARTHRUM. Newman.

1834 BREVIFOSSUM Newm. Ann. Nat. Hist., 1839, II., p. 392.
cylindricum, (var.) Smith. Col. Ins. Brit. Mus., 1851, p. 21.
australicum, (var.) Waterh. Ent. Month. Mag., 1876, XIII., p. 119.
Australia, (widely distributed.)

ANCISTRIA. Erichson.

1835 RETUSA Fab. Syst. El., II., p. 555.
Prionophora cylindrica Westw. Cab. Orient. Ent., p. 85, t. 41, f. 6.
Wide Bay, Cape York, &c.; Queensland. Tasmania.

PROSTOMIS. Latreille.

1836 ATKINSONI Waterh. Ent. Month. Mag., 1877, XIV., p. 26.
Alps of Victoria and Tasmania.

1837 CORNUTUS Waterh. Ent. Month. Mag., 1877, XIV., p. 26.
South Australia and Tasmania.

BESSAPHILUS. Waterhouse.

1838 CEPHALOTES Waterh. Ent. Month. Mag. 1877, XIV., p. 27.
Tasmania.

Sub-Family. CUCUJIDES.

CUCUJUS. Fabricius.

1839 COLONIARIUS Olliff. Proc. Linn. Soc., N. S. Wales, 1885 (2), X., p. 207.
Illawarra; N. S. Wales.

IPSAPHES. Pascoe.

1840 BICOLOR Olliff. Proc. Linn. Soc., N. S. Wales, 1885 (2), X., p. 209.
New South Wales and Victoria.

1841 MŒROSUS Pascoe, Journ. of Ent., 1863, II., p, 40, t. 3, f. 9.
New South Wales and Tasmania.

PLATISUS. Erichson.

1842 ANGUSTICOLLIS Reitter. Verh. z-b. Wien, 1878, XXVIII., p. 189.
Platisus obscurus Lacord. Gen. Col., 1854, II., p. 403, t. 21, f. 1.
Australia and Tasmania.

1843 INTEGRICOLLIS Reitter. Verh. z-b. Wien, 1878, XXVIII., p. 188.
Australia.

1844 OBSCURUS Erich. Wiegm. Arch., 1842, I., p. 216.
New South Wales, Victoria, Tasmania.

LÆMOPHLÆUS. Castelnau.

1845 AMABILIS Olliff. Proc. Linn. Soc., N. S. Wales, 1885 (2), X., p. 211.
New South Wales and Queensland.

1846 ARTICEPS Olliff. Proc. Linn. Soc., N. S. Wales, 1885 (2), X., p. 213.
New South Wales and Queensland.

1847 BISTRIATUS Grouvelle. Ann. Soc. Ent. Fr., 1878 (5), VIII., p. 72, t. 2, f. 8.
New South Wales and Tasmania.

1848 CONTAMINATUS Grouvelle. Bull. Soc. Ent. Fr., 1877 (5), VII., p. 219; Ann Soc.. Ent. Fr., 1878 (5), VIII, p. 265, t. 8, f. 7.
Wide Bay; Queensland.

1849 CONTERMINUS Olliff. Proc. Linn. Soc., N. S. Wales, 1885 (2), X., p. 214.
Wide Bay; Queensland. Kiama; N. S: Wales.

1850 INSIGNIS Grouvelle. Ann. Mus., Genov., 1883, XVIII., p. 279, t. 7, f. 5.
Cape York; N. Australia.

1851 LEACHII Grouvelle. Ann. Soc. Ent. Fr., 1876 (5), VI., p. 499, t. 9, f. 18.
New South Wales.

1852 LEPIDUS Grouvelle. Ann. Mus. Genov., 1883, XVIII., p. 280, t, 7, f. 6.
Cape York; N. Australia.

1853 MACLEAYI Olliff. Proc. Linn. Soc., N. S. Wales, 1885 (2), X., p. 216.
Placonotus longicornis Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 168.
Gayndah; Queensland.

1854 PARVULUS Grouvelle. Ann. Mus. Genov., 1883, XVIII., p. 289, t. 7, f. 15.
Northern Queensland.

1855 RAMSAYI Olliff. Proc. Linn. Soc., N. S. Wales, 1885 (2), X., p. 212.
Wide Bay; Queensland.

1856 RIGIDUS Olliff. Proc. Linn. Soc., N. S. Wales, 1885 (2), X:, p. 216.
King George's Sound; W. Australia.

1857 TASMANICUS Grouvelle. Ann. Soc. Ent. Fr., 1876 (5), VI., p. 498, t. 9, f. 17.
Tasmania.

1858 TESTACEUS Fab. Mant. Ins., 1787, I., p. 166.
cucujus testaceus Fab.
Læmophlœus testaceus Sturm. Ins., XXI., p. 46, t. 383, f. A
Læmophlœus Zimmermanni Le Conte. Proc. Ac. Phil., 1854, p. 75.
N. S. Wales, and Tasmania.

1859 TUBERCULATUS Grouvelle. Bull. Soc. Ent., Fr. 1877, (5), VII., p. L; Ann. Soc. Ent. Fr., 1878, (5), VIII., p. 71, t. 2, f. 6.
Australia.

Sub-Family. BRONTIDES.

DENDROPHAGUS. Schönherr.

1860 AUSTRALIS Erichs. Wiegm. Arch., 1842, I., p. 217.
Australia and Tasmania. (Widely distributed.)

BRONTES, Fabricius.

1861 AUSTRALIS Erichs. Weigm. Arch., 1842, I., p. 217.
Tasmania.

1862 DENTICULATUS Smith. Col. Ins. Brit. Mus., 1851. I., p. 14.
Australia.

1863 LUCIUS Pascoe. Journ. of Ent., 1862, I.. p. 321.
? nigricans Pascoe. Journ. of Ent., 1862, I., p. 321.
Queensland, N. S Wales, Victoria.

1864 MACLEAYI Olliff. Proc. Linn. Soc. N. S. Wales, 1885, (2), X., p. 218.
Port Darwin; N. Australia. Richmond River; N. S. Wales.

1865 MILITARIS Erichs. Wiegm. Arch., 1842, I., p. 217.
N. S. Wales, Victoria, Queensland, Tasmania.

Sub-Family. HEMIPEPLIDES.

INOPEPLUS. Smith.

1866 DIMIDIATUS Waterh. Trans. Ent. Soc., Lond., 1875, p. 191.
N. S. Wales and Queensland.

1867 TREPIDUS Pascoe. Journ. of Ent., 1862, I., p. 322.
Cape York; N. Australia.

Sub-Family. TELEPHANIDES.

CRYPTAMORPHA. Wollaston.

1868 DESJARDINSII Guér. Règn. Anim., 1829, V., p. 196.
Psammœcus Desjardinsii Guér.
Australia. (Widely distributed).

1869 OPTATA Olliff. Proc. Linn. Soc., N. S. Wales, 1885 (2), X., p. 221.
Tasmania.

1870 TRIGUTTATA Waterh. Ent. Month. Mag., 1876, XIII., p. 123.
South Australia and Tasmania.

Sub-Family. SILVANIDES.

SILVANUS. Latreille.

1871 ATRATULUS Grouvelle. Bull. Soc., Ent. Fr. 1877 (5), VII., p. CLIX.; Ann. Soc. Ent. Fr., 1878 (5), VIII., p. 266, t. 8, f. 9.
Australia.

1872 BREVICORNIS Erichs. Wiegm. Arch., 1842, I., p. 218.
Tasmania.

1873 CASTANEUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 168.
Gayndah; Queensland; N. S. Wales.

1874 CONGENER Olliff. Proc. Linn. Soc., N. S. Wales, 1885 (2), X., p. 223.
South Australia.

1875 SURINAMENSIS (Dermestes). Linn. Syst. Nat., 1767, I., pt. 2, p. 565; Stephens, Ill. Brit. Ent., 1830, III., p. 104.
Australia (Introduced.)

MYRABOLIA. Reitter.

1876 HAROLDIANA Reitter. Col. Hefte., 1876, XV., p. 56.
Australia.

1877 GROUVELLIANA Reitter. Verh. z-b. Wien., 1877, XXVII., p. 179.
Tasmania.

NAUSIBIUS, Redtenbacher.

1878 DENTATUS (Silvanus) Marsham. Ent. Brit., p. 108.
Nausibius dentatus Jacq. Duv. Gen. Col., II., pl. 50, f. 250.
Australia. (Introduced.)

Family. CRYPTOPHAGIDÆ.

CNECOSA. Pascoe.

1879 FULVIDA Pasc. Journ. of Ent., 1865, II., p. 466, t. 18, f. 2.
Sydney; N. S. Wales.

Family. LATRIDIDÆ.

LATRIDIUS. Herbst.

1880 COSTATUS Erichs. Wiegm. Arch., 1842, I., p. 242.
Tasmania.

CORTICARIA. Marsham.

1881 POLITA Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 169.
Gayndah; Queensland.

1882 SUBTILISSIMA Reitter. M T. Münch. Ent. Ver., 1877, I., p. 139.
Australia,

CONINOMUS. Reitter.

1883 BIFASCIATUS Reitter. M T. Münch. Ent. Ver., 1877, I., p. 138.
Australia.

Family. MYCETOPHAGIDÆ.

TRYPHYLLUS, Latreille.

1884 FASCIATUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 170.
Gayndah; Queensland.

DIPLOCŒLUS. Guérin.

1885 OVATUS Macleay Trans, Ent. Soc., N. S. Wales, 1871, II., p. 170.
Gayndah; Queensland.

1886 PILIGER Reitter. Verh. Ver. Brünn, 1880, XVIII., p. 6.
Australia.

Family. DERMESTIDÆ.

DERMESTES. Linné.

1887 CADAVERINUS Fabr. Syst. Ent., p. 55; Oliv. Ent., II. (9), p. 7, t. 2, f. 9, a-b.
Australia. (Introduced.)

1888 FELINUS Fabr. Mant., I. p. 34.
ater De Geer. Ins., IV., p. 223, t. 18, f. 7.
piceus Thunb. Nov. Ins. Spec., I., p. 8.
Australia.

1889 LARDARIUS Linné. Faun. Suec., p. 140; Curtis, Brit. Ent., XV., t. 682; Erichs., Nat. Ins., III., p. 346; Sturm., Ins., 1847, p. 65, t. 349.
Australia and Tasmania. (Introduced.)

1890 MURINUS Linné. Faun. Suec., p. 144; Erichs. Nat. Ins., III., p. 429.
Queensland. (Introduced.)

1891 VULPINUS Fabr. Ins., I., p. 64; Erichs., Nat. Ins., III., p. 426.
Australia. (Introduced.)

MEGATOMA. Herbst.

1892 APICALIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 170.
Gayndah; Queensland.

1893 MORIO Erichs. Wiegm. Arch., 1842, I., p. 152.
Tasmania.

1894. TENUIFASCIATA Reitter. Verh. Ver. Brünn, 1881, XIX., p. 36.
Tasmania.

CRYPTORRHOPALUM. Guérin.

1895 CONFERTUM Reitter. Verh. Ver. Brünn., 1881, XIX., p. 56.
S. Australia.

1896 ERICHSONI Reitter. Verh. Ver. Brünn, 1881, XIX., p. 56.
Tasmania and Victoria.

1897 OBSCURUM Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 171.
Gayndah; Queensland.

1898 VARIABILE Reitter. Verh. Ver. Brünn., 1881, XIX., p. 56.
South Australia.

THAUMAGLOSSA.

1899 CONCAVIFRONS Reitter. Verh. Ver. Brünn., 1881, XIX., p. 43.
Tasmania.

TROGODERMA. Latreille.

1900 APICIPENNE Reitter. Deutsche. Ent. Zeit., 1881, XXV., p. 232.
Australia.

1901 RIGUUM Erichs. Wiegm. Arch., 1842, I., p. 152.
Tasmania.

ANTHRENUS. Geoffroy.

1902 AUSTRALIS Hope. Trans. Ent. Soc., Lond., 1845, IV., p. 105.
South Australia.

1903 MUSEORUM Linné. Faun. Suec., p. 145; Erichs. Nat. Ins., III., p. 457.
Australia. (Introduced.)

1904 NIGRICANS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 171.
Gayndah; Queensland.

TRINODES. Latreille.

1905 GLOBOSUS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 171.
Gayndah; Queensland.

1906 PUNCTIPENNIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 171.
Gayndah; Queensland.

Family. BYRRHIDÆ.

MICROCHÆTES. Hope.

1907 AUSTRALIS Boisd, Voy. Astrol. Col., p. 149; Dej. Cat., 3 ed., p. 145.
Australia.

1908 COSTATUS Macleay, Trans. Ent. Soc., N. S. Wales, 1871, II., p. 172.
Gayndah ; Queensland.

1909 FASCICULARIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 171.
Gayndah ; Queensland.

1910 MINOR King. Trans. Ent. Soc., N. S. Wales, 1869, II., p. 73.
Sydney, Parramatta, &c. ; N. S. Wales

1911 SCOPARIUS Erichs. Wiegm. Arch., 1842, I., p. 153.
Australia and Tasmania. (Widely distributed).

1912 SPHÆRICUS Hope. Trans. Ent. Soc., Lond., 1834, I., p. 13, t. 1, f. 2.
Swan River ; W. Australia.

PEDILOPHORUS. Steffahny.

1913 HETEROMERUS King. Trans. Ent. Soc., N. S. Wales, 1869, II., p. 74.
Gawler ; S. Australia.

BIZENIA. King.

1914 FORMICICOLA King. Trans. Ent. Soc., N. S, Wales, 1869, II., p. 74.
Liverpool ; N. S. Wales.

LIMNICHUS. Latreille.

1915 AUSTRALIS Erichs. Wiegm. Arch., 1842, I., p. 153.
Tasmania.

1916 FRONTALIS Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 172.
Gayndah ; Queensland.

Family. GEORYSSIDÆ.

GEORYSSUS. **Latreille.**

1917 Australis King. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 158, t. 14.
Parramatta; N. S. Wales.

1918 Kingi Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 172.
Gayndah; Queensland.

Family. PARNIDÆ.

LUTROCHUS. **Erichson.**

1919 Australis King. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 159, t. 14.
Parramatta River; N. S. Wales.

ELMIS. **Latreille.**

1920 metallicus King. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 160.
Murray River.

1921 montanus King. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 160.
Illawarra; N. S. Wales.

1922 novemnotatus King. Trans. Ent. Soc., N. S. Wales, 1864, I., p, 159.
Parramatta River; N. S. Wales.

1923 politus King. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 160.
Parramatta River; N. S. Wales.

1924 punctulatus King. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 161.
Parramatta River; N. S. Wales.

LIMNIUS. Müller.

1925 QUATUORMACULATUS King. Trans. Ent. Soc., N. S. Wales, 1864, I., p. 161.

Parramatta River; N. S. Wales.

Family. HETEROCERIDÆ.

HETEROCERUS. Fabricius.

1926 AUSTRALASIÆ Waterh. Trans. Ent. Soc., Lond., 1874, p. 536.

W. Australia.

1927 MASTERSI Macleay. Trans. Ent. Soc., N. S. Wales, 1871, II., p. 173.

Gayndah; Queensland.

ELYTHOMERUS. C. O. Waterhouse.

1928 ELONGATULUS Waterh. Trans. Ent. Soc., Lond., 1874, p. 535.

Queensland.

PLAGIOSTOMATA OF THE PACIFIC.

PART III.

BY N. DE MIKLOUHO-MACLAY AND WILLIAM MACLEAY., F.L.S., &C.

PLATES XLV. and XLVI.

1. HETERODONTUS ZEBRA. Grey.

Pl. XLV.

Cestracion Zebra Grey. Zool. Misc., p. 5.

Heterodontus zebra Grey. Chondropt., p. 61 ; Bleek, Verh. Bat., Gen. 26 ; Act. Soc. Sc., Neerl., I. Amboyna, p. 71.

This species has been for many years considered as simply a synonym or variety of *Heterodontus Phillippi*, and as such it has been recorded in Gunther's Catalogue of Fishes. We, however, in our first paper on the "Plagiostomata of the Pacific," gave it as our opinion (1) that the Indian and Japanese Cestracions would prove on examination to be a distinct or possibly two distinct species. Some years after that paper was written we published Part II. of the "Plagiostomata of the Pacific," (2) in which we gave a detailed description and figure of a *Heterodontus*, which the Australian Museum had received from Japan.

We recognised that specimen as the fish figured under the name of *Cestracion Phillippi* in Perry's United States Expedition to Japan, and we thought it not unlikely that it might be the *C. zebra* of Grey. In the absence, however, of any proof of its identity with that species, and finding it to be undoubtedly distinct from *Phillippi*, we gave it the name of *Japonicus*.

We have now to record the existence of another species of *Heterodontus* which is undoubtedly the *C. zebra* of Grey. It is an inhabitant of the China Sea ; was captured at Swatow, and was procured by Mr. Ramsay from the Chinese Court at the International Fisheries Exhibition in London, in the year 1884. The specimen is a young female, and has the characteristic specific marking, as is the case with the young of all the species, very distinct.

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(1) Proc. Linn. Soc., N. S. Wales, Vol. III., p. 313.
(2) Proc. Linn. Soc., N. S. Wales, Vol. VIII., p. 426.

The head differs but slightly from that of *H. japonicus.* The teeth could not be very satisfactorily examined without a lateral incision through the cheek, which, as the specimen is unique, could not be permitted, but the anterior teeth and a portion of the lateral pavement-like teeth were quite visible through the orifice of the mouth.

The front teeth are each armed with 5 cusps; the three middle cusps are the largest, but the exterior ones, though small and obtuse, are quite distinct (fig. 4.) The centre rows of these front teeth have the central cusp large and perpendicular, while in the lateral rows, it is, in proportion to the other cusps, smaller and recumbent. (Fig. 5.)

In the extreme lateral row on each side of these front teeth the united cusps take the form of a longitudinal crest. The lateral pavement-like teeth are narrow, and show a median longitudinal line. In the upper jaw the cuspid teeth are in 15 rows, the lateral in four ; in the lower jaw, 11 of the one and 4 of the other.

Nasal flap long. The upper labial fold covering partly the lower fold, turns round the corner of the mouth, and enclosing the lower labial fold, forms a second lower fold, of which only a margin is visible. This peculiarity is seen where the upper fold is turned up as in fig. 7. These folds are thin skinned and with thinly scattered tentacles.

The dorsal fins are very falcate, the first about double the size of the second; the spines are large, acutely pointed, and sword-shaped, the sides being very flat and compressed and prominently ridged on the dorsal edge ; the anal fin is small and falcate; the caudal is longer and more falcate than in *H. japonicus.* The colour is a pale brownish-yellow, with numerous bars of dark brown disposed in alternate broad and narrow bands from the snout to the extremity of the tail, in all over twenty in number, that on the snout triangular, the next forming, over the eyes, two broad bars separated by a narrow belt of ground colour, two others of the same kind on the nape, then one rather narrower, a double one again at the dorsal spine, extending on the pectoral fin, and so on, broad double and single bands alternating to the middle of the tail; these bands in no case extend across the belly.

2. MYLIOBATIS PUNCTATUS. N. sp.

Pl. XLVI. Figs. 1-6.

More than one specimen of this remarkable Ray was captured by one of the authors of this paper (N. de Miklouho-Maclay) during a visit to the Admiralty and Lub, or Hermit Islands, in the year 1879. To preserve a specimen of this fish was under the circumstances impossible, but drawings and copious notes were made on the spot. A jaw was prepared, which however, was afterwards unfortunately lost.

The most remarkable feature in this fish, is undoubtedly the prolongation of the cephalic fins into a triangular pointed depressed snout, as represented in fig. 4. The following measurements were taken from a male adult specimen.

From the tip of the snout to the extremity of the ventral fin	1130 mm.
Length of tail from dorsal fin	640 „
Diameter of the disk	1430 „
Longitudinal diameter of the Spiracle	50 „
Length of longer spine	140 „
„ shorter „	82 „

The colour of the upper surface is greenish-grey with white spots of different sizes, irregularly distributed, the under surfaces dirty white, getting darker on the pectoral fins. The snout is long and triangularly pointed. The eyes small with a vertical oval pupil. Spiracles very large. Two barbed spines on the tail, one side of the longer one is flatter than the other, which is marked with longitudinal furrows and ridges; the shorter spine is rounder, both are barbed alike. (Figs. 5, 5′ and 6.)

The nostrils are in a horizontal line with the eyes.

Two curtain-like flaps overlap the lateral labial folds, which are distinct when the mouth is open; the lower border of the labial flaps is slightly notched. The teeth-plates of the upper jaw are nearly twice as wide as the lower. (48 mm. the upper, 27 mm. the lower.) These plates consist of many longitudinal rows of teeth, of which the middle ones are largest.

On the back of the mouth there are rows of papillæ on the palate, seven in the first row and four in the second; there are similar but smaller papillæ on the sides of the teeth of the lower jaw. (Fig. 4.)

The gill openings are of uniform size, but the distance between the two anterior is nearly double that between the posterior. The claspers are relatively small and cylindrical.

3. DISCOBATIS MARGINIPINNIS.

This Ray was taken at Sorry or Wild Island, one of a group of islands surrounding the Nares Harbour, on the north-west coast of the large Admiralty Islands, during the same expedition as that in which the *Myliobatis* just described was taken, and like it, no specimen has been preserved. However, from drawings made on the spot, a tolerably accurate diagnosis can be made out. It is evidently of the family *Trygonidæ*, and belongs to that section of them, which is without a spine on the tail, but it differs so much from the known genera of that section as to necessitate placing it in a new genus with the following characters.

DISCOBATIS. Nov. gen.

Tail shorter than the disk, cylindrical, without fin or spine, thick at the base and tapering to the apex. Disc circular. Body quite smooth, ventral fins without notch. Teeth small and closely impacted as in the Trygonidæ generally.

DISCOBATIS MARGINIPINNIS. N. sp.

Pl. XLVI. Fig. 7-15.

Upper surface, light brown with blue spots, irregularly distributed. Large spiracles (Fig. 9). Iris yellow, flap of the same yellow also, but with a dark margin. *Under surface* white, with a yellow margin, which, however, does not run all round the disc, but leaves the upper part of the same free. (1) The gill openings of equal size.

Tail, thick and stiff, with a medium blue line on the upper side, and two lateral ones on the sides, half as long as the body.

Dimensions of a ♂ :—

From the upper margin of the disc to the end of tail... 541 mm.
" " " " to the lower border
of the disc ... 335 mm.

Dentition.—The teeth of *D. marginipinnis* are, at the first glance of nearly the same shape and size in both jaws; they are closely impacted. and present, as in other Trygonidæ, a kind of mosaic pavement "symmetrically arranged." (Fig. 13.) Inspected more closely, the teeth of each jaw consist of three portions—a median and two lateral ones, which are more distinct in the lower jaw, being divided from each other by a vertical row of teeth with longer and more pointed cusps. (These two rows seem to be characteristic of the species.)

The number of rows of teeth and of teeth in each row, is nearly the same in each jaw. (There are about 32 or 33 transversal rows in each jaw, and from 10-13 teeth in the median vertical rows, whilst in the rows of the lateral portions from 6-8 only.) These numbers being of course dependent upon the age, and very likely, upon the sex of the specimen can not be regarded as characters of the species.

Each tooth has a rhomboidal base supporting a more or less distinct median cusp directed backwards. (Fig. 14.)

The cusps of the teeth of the lower jaw are more obtuse than in the upper, with the exception of the already mentioned two vertical rows which show the largest teeth of the lot with the longest cusps. (Fig. 15.)

Habitat: Pacific Ocean, near the Admiralty Islands. Native names—*Bai* at Sorry and *La* at Andra (another Island on the north-coast of the large Admiralty Islands but further east.)

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(1) Examination of Fig. 10 will give a better idea of the shape of the mouth and nostrils than descriptions.

EXPLANATION OF PLATES XLV. and XLVI.

Lettering followed throughout all the figures on both Plates :—

a.—Superior oral fold.
a'.—Continuation of the superior oral fold, enclosing the lower oral fold and forming a second inferior oral fold.
b.—Inferior oral fold.
f.—Internal nasal flap.
n.—External orifice of the nasal groove.
Sp.—Spiracle.

PLATE XLV.

Heterodontus zebra, Grey.

Fig. 1.—Young ♀ from above. (From a photo.) A little more than twice the natural size.
Fig. 2.—The same from the side.
Fig. 3.—Ventral aspect of the anterior part of the head of the same.
Fig. 4.—One of the anterior 5-cusped teeth. (About four times the natural size.)
Fig. 5.—One of the lateral cuspidated teeth. (About four times the natural size.)
Fig. 6.—Lateral view of the anterior part of the head. (About twice the natural size.)
Fig. 7.—The same view, but with the internal nasal flap *(f)* lifted up.
Fig. 8.—Outline of the upper portion of the head from the front, to show the supra-orbital ridges.

PLATE XLVI.

Fig. 1-6.—*Miliobatis punctatus*, Mcl.
Fig. 1.—The same from above.
Fig. 2.—Ventral aspect of the same.
Fig. 3.—Lateral view of the head.
Fig. 4.—Ventral view of the head, to show the general shape of the snout and of the mouth, and the papillæ on the palate and the sides of the mouth, half natural size.
Fig. 5.—The larger of the two barbed spines. (Natural size.)
Fig. 5'.—A portion of the same twice enlarged, to show the shape of the lateral barbs.
Fig. 6.—The smaller of the two barbed spines. (Natural size.)
Fig. 7-15.—*Discobatis marginipinnis*, Mcl.
Fig. 7.—The same from above.
Fig. 8.—Ventral view of the same.
Fig. 9.—The eye and spiracle from the side.
Fig. 10.—Mouth and nostrils. The skin below the mouth appears tuberculated.
Fig. 11.—The same as Fig. 10, but the nasal flap on one side is uplifted, to show the mouth and its communication with the nasal cavity.
Fig. 12.—View of the mouth from the inside, to show the notched palatal fold.
Fig. 13.—Teeth of the upper and lower jaw. Slightly enlarged.
Fig. 14.—Front teeth, enlarged about four times.
Fig. 15.—Teeth of the lower jaw with longer and more pointed cusps.

IV. ADDENDUM TO THE AUSTRALIAN HYDROMEDUSÆ.

HYDRA HEXACTINELLA. Nova Species.

PLATE XLVIII., Fig. 1-4.

BY R. VON LENDENFELD, PH.D.

In my paper, Monograph of the Australian Hydromedusæ, Part III. (Vol. IX., page 345 of these Proceedings), I mentioned three species as the Australian representatives of the genus Hydra. I found afterwards that the specimens described as distinct, under the names of Hydra oligactis and Hydra fusca respectively, are identical, and I place these in my amended catalogue (Zeitschrift für wissenschaftliche Zoologie, Band XLI., Seite 627) in the first species Hydra oligactis, Pallas. The reasons for this are given in the first Addendum to the Australian Hydromedusæ (Vol. IX., page 908, of these Proceedings.)

In Australasia we accordingly find the genus Hydra represented by two species :—

1. Hydra oligactis, Pallas, Victoria.
2. Hydra viridis, Linné, New Zealand.

To these two, a third species from New South Wales must now be added, which brings the total number of Australian species belonging to this order, up to 255.

HYDRA HEXACTINELLA. Nova Species.

This species can be distinguished from all other Hydras by the constancy in the number of arms, which is invariably six. These tentacles are all equal in length and thickness, and the angles between them are perfectly equal, measuring 60°. Such a regularity has been observed in no other species. It appears that in this respect our Hydra is more highly developed than the others as the number of antimeres has been defined. The specific name is derived from this characteristic.

The body is perfectly cylindrical, and extends under circumstances to a length of 15 mm., whereby it becomes about 0·1 mm. thick. When contracted it measures 1 x 0·5 mm. In the extended state the body curves in a very graceful manner. The surface of attachment is 0·4 mm. in diameter. The whole of the body is colourless. Only the entodermal cells lining the narrow gastral cavity have a slight yellowish tinge, visible only in transmitted light.

The arms when fully extended attain a length of 5 mm., and a thickness of 0·02 mm. They are usually curved backward in a very graceful manner as shown on the plate.

HISTOLOGY.

On the arms there are two kinds of cnidoblasts (fig. 2) with different cnidocells. In this respect our species is very similar to those Hydras which were examined by Jickeli, to whose figure (Morphologisches Jahrbuch, Band VIII., Tafel XVII., 12), I refer the reader.

Elements like those described by Jickeli (l.c.) as ganglia cells have been seen by me in the ectoderm of the tentacles of Hydra hexactinella. They appeared more clearly visible after staining with Beale's carmine than with hæmatoxylin, (Osmic acid in both cases.) I have not been able to distinguish a nucleus in these structures, the ganglionic nature of which appears to me a little doubtful. I find (fig. 2 *g*) that these cells cause by their presence the formation of a protuberance of irregular outline, being as they are, interposed between the thin covering ectoderm and the unyielding supporting lamella below. I think it not quite impossible that these large highly colourable bodies are the nuclei of sensitive cells similar to the palpocils of Sarsia-polyps.

I have not observed these structures in the fresh state. They can only be studied with advantage in osmic acid specimens.

Seen from the surface these problematic ganglia cells generally appear circular (fig 4), but sometimes, although rarely, processes are found (fig. 3), apparently radiating from them. These would support the hypothesis put forth by Jickeli, that the structures in question are ganglia cells.

Should we however, assume these structures to be only nuclei, then we must consider the very minute bodies in them as nucleoli.

This species has been discovered in a pool at Moore Park where it grows in abundance, by Mr. Whitelegge, who has kindly preserved specimens for me for description.

EXPLANATION OF PLATE XLVIII.

Fig. 1.—*Hydra hexactinella.* R. v. L.
3:1 magnified.

Fig. 2. -Optical longitudinal section through portion of a tentacle of *Hydra hexactinella*, osmic acid, Beale's carmine.
magnified 250:1.
(*g*) ganglia (?) cell.

Fig. 3 and 4.—Ganglia (?) cells seen from the surface. Osmic acid, Beale's carmine
magnified 400:1.

Fig. 3.—With two nervous (?) processes.

Fig. 4.—The usual kind without processes.

A SECOND NOTE ON "MACRODONTISM" OF THE MELANESIANS. (1)

By N. de Miklouho-Maclay.

(Plate XLIX.)

In the resumé of the results of Anthropological Observations during a trip to Melanesia in 1879-80, (2) I have stated *inter alia,* that I had the opportunity of making further observations *re* "Macrodontism" in the Admiralty Islands and the Lub Archipelago.

When I first (in 1876) discovered this peculiarity at the Admiralty Islands, the natives, who had been before then very little in contact with white men, were exceedingly shy, and it was only a chance and a matter of some tact and great patience to induce the natives to let me examine, measure, and sketch their teeth. A closer inspection was completely out of question, they would resist or run away at once. It was therefore not easy to come to a decided opinion about the nature of the enlargement of the teeth.

At the Islands of Lub, I succeeded at last in obtaining a piece of an enlarged tooth, the microscopical and chemical examination of which might decide the question of the nature of "Macrodontism." For various reasons, I decided to send the above-mentioned specimen to Prof. Virchow at Berlin, but, to my greatest annoyance, the small parcel given in charge of a gentleman going from Sydney to Europe, was lost by his carelessness (was forgotten in the cabin, when changing the steamer at Point de Galle). I was informed about the loss of this interesting specimen only on my return from the cruise amongst the Islands of Melanesia (1879 and 1880), during which, as already mentioned, I succeeded in making further investigation on "Macrodontism."

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(1) My first note "On Macrodontism," appeared in the Proceed. of the Linn. Soc. of N.S.W., Vol. III., p. 169.

(2) A resumé of the results of Anthropological and Anatomical Researches in Melanesia and Australia (March 1879—January 1881) in the Proceed. of the Linn. Soc. of N.S.W., Vol. VI., p. 171.

As it was now my third visit to these Islands (Admiralty and Lub Islands), the natives treated me as an old acquaintance, especially as I could speak a little of their dialect. Living on shore, my face, manners and ways became quite familiar to the natives, who remembered my two former visits very well. Finding by experience that my proceedings (anthropological measurements, sketching, photographing, etc., etc.), were quite harmless, the natives began to regard them with much less distrust and antipathy than before, and many large-toothed people had their teeth examined, measured, and sketched without making any objection. This time I examined a greater variety of the large teeth and succeeded in getting some pieces of the same, and soon arrived at a different opinion to my former one (1), namely, that the enlargement of the teeth is due *not* to a real enlargement of the tooth (an hypertrophy of the dentinum), but is simply *an excessive accumulation of tartar*, the formation of which is increased by the constant supply of lime from the chewing of the areca-betel-lime combination (2). The examination of a large tooth, which I purchased, left no doubt that the same was covered with a kind of black, hard incrustation, which could be gradually removed with a sharp scalpel in the shape of more or less thin layers, leaving the apparently unaltered tooth in the centre. In another specimen, the tooth could be removed like a kernel from a nutshell.

I showed one of the specimens of the enlarged teeth to Mr. P. R. Pedley, who expressed his conviction that the dark brown crust on the teeth could not be anything else, but a *salivary calculus*, peculiarly stained by the special food of the natives.

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(1) Loc. cit. Proceed. Linn. Soc. of N.S.W., Vol. 1, p. 172.

(2) The root of the Piper betel is used by the natives of Admiralty Islands to a greater extent than in other places, where the leaves and fruits are mostly in demand. The proportion of different ingredients used by areca-betel-lime-chewers, appeared to me very different in different countries, which differences in the combination of course alters the immediate effect of the chewing, and produces in time different results on the bodies of the indulgers. Moreover, in some places (for instance, the Malay-Peninsula and some Islands of the Malay Archipelago) Tobacco and Gambier (Nauclea gambir) are added to the Areca nut and the Betel.

Some months after my return to Sydney (in January, 1881), I received from Berlin the "Sitzungsberichte der Berliner Gesellschaft für Anthropologie, Ethnologie und Urgeschichte," for 1881, in which a letter appeared from F. A. de Roepstorff, Government Resident on the Nicobar Islands (1). The subject of the letter is: *the remarkably large teeth of the Nicobarese.* In this letter the writer says, that having read my account about the large-toothed Melanesians, (2) and examined the adjoined plate (3), he was surprised to find that amongst the Nicobar Islanders this peculiarity is also not a rare occurrence. Mr. Roepstorff forwarded to Prof. Virchow some large teeth, which he acquired from the tribe of the Shom-Moat of the Nancowry Group. The chemical analysis proved that the incrustation which covered the teeth of these men was a kind of tartar (Zahnconcrement) consisting chiefly of brown-stained lime. (4) Prof. Virchow referring to this

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(1) Sitzungsberichte der Berliner Gesellschaft für Anthropologie, Ethnologie und Urgeschichte. Sitzung am 18 Juni, 1881, p. 218.

(2) *Loc. cit.* Sitzung am 16 Dec., 1876.

(3) *Loc. cit.* Plate XXVI.

(4) Die von Herrn Salkowski angestellte chemische Analyse ergab folgendes Resultat:—

"Die feingepulverte Substanz schwärzt sich beim erhitzen unter Verbrei-
"tung des Geruches nach verbranntem Horn, sie löst sich sowohl vor, wie
"nach dem Glühen unter Hinterlassung eines unbedeutenden Rückstands
"und unter Aufbrausen (Kohlensäure) in Salzsäure. Die Salzsäure
"Lösung enthält als Hauptbestandtheile Kalk und Phosphorsäure, daneben
"Magnesia, Eisenoxyd, sehr geringe Mengen von Alkalien, Spuren von
"Schwefelsäure und Kieselsäure. Die Salpetersäure Lösung giebt mit
"Silberlösung keine merkliche Trübung, its also frei von Chloriden resp.
"Salzsäure."

Die quantitave Bestimmung der Hauptbestandtheile ergab folgende Zusammensetzung:

Wasser	5·95 p. ct.
Orgainsche Substanz	9·10 ,,
Unorganischer unlöslicher Rückstand (Kieselsäure, Eisenoxyd)	0·87 ,,
Phosphorsaures Eisenoxyd	2·26 ,,
Kalk	45·24 ,,
Magnesia	0·68 ,,
Phorphorsäure	30·73 ,,
Kohlensäure	4·87 ,,
	99·70 p. ct.

(*Verhandlungen der Berliner Gesellschaft für Anthropologie, Ethnologie und Urgeschichte*, Jahrgang, 1881. Sitzung von 18 Juni, p. 219.)

communication of Mr. Roepstorff made the remark (1), that although the large size of the teeth of the Nicobarese depends, according to the chemical analysis, upon the formation of a new kind of tartar (Weinstein), it remains still a question, whether it is possible to explain in the same way the large teeth of the Melanesians described by me, and that in the latter case further clearing up is necessary.

The present note shows, that in my opinion, the enlargement of the teeth of the natives of the Admiralty and Lub-Islands is of a similar nature to that which occurs amongst the Nicobar Islanders, and is very likely produced by the same cause. A striking example of the size attained by teeth, incrusted with this kind of tartar, is represented on the adjoined plate. (Figs. 9, 10, 11, 12.)

The very remarkable size of the two lower incisors *(carefully measured)* causes one to wonder, how they can find room in the mouth.

The "*Lechen-tshuven*" (2) are regarded by the natives, as far as I could observe, as a kind of beauty, and possessors of such are apparently very proud of them and treat them with care. (3)

The above explains sufficiently *why* the designation "*Macrodontism,*" must be dropped. It may be replaced by the name *Odontolithiasis,* which is certainly a more suitable one. (4)

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(1) *Loc. cit.* Sitzung am 18 Juni, 1881, p. 219.

(2) The natives on the Island Sorry' (or Wild Islands) in Nares Harbour, call the large teeth "*Lechen-tshuven.*" Very likely the name in the other dialects of the Admiralty Islands for the same will be different.

(3) Care is necessary, because the enormous teeth have not correspondingly enormous fangs.

(4) I am indebted to Prof. W. J. Stephens for the suggestion of this very appropriate name, from ὄδους tooth, and λιθίασις, stony deposit.

EXPLANATION OF PLATE XLIX.

(All the figures, with exception of Fig. 9 and Fig. 10, of *natural size.*)

Fig. 1-Fig. 4.—Crust of tartar of two upper incisors. The external surfaces dark brown, smooth as if polished.

Fig. 1.—The same from the front.

Fig. 2.—The same from behind.

Fig. 3.—The same from the side.

Fig. 4.—The same from above, showing distinctly that the crust has been covering two incisors.

Fig. 5, Fig. 8.—One of the upper incisors, covered with a dark brown crust of tartar, leaving only a portion of the fang *(f)* free.

Fig. 5.—The same from the front.

Fig. 6.—The same from behind.

Fig. 7.—The same from the side.

Fig. 8.—The same from below, showing two smooth surfaces.

Fig. 9.—Half-opened mouth in profile of Burumo, a native of the Island Sorry' in Nares Harbour, showing very large salivary calculi covering the incisors. (About one-half of the natural size.)

Fig. 10.—Mouth of the same, en face.

Fig. 11.—Upper surface of the crust of tartar, enclosing the middle incisors ot the upper jaw. Exact measures in millimeters.

Fig. 12. Upper surface of the crust of tartar covering the lower incisors. The exact measures are marked in millimeters. The thickness of the larger calculus was exactly 8 mm. The upper outlines of the teeth were covered with detritus of food, *Leptothrix buccalis, &c.*

NOTE ON THE "KÉU" (1) OF THE MACLAY-COAST, NEW GUINEA.

BY N. DE MIKLOUHO-MACLAY.

My last paper, " List of Plants in use by the Natives of the Maclay-Coast, New Guinea," was already printed, when I discovered, quite unexpectedly, amongst old letters a forgotten note of the late Dr. R. H. C. C. Scheffer, Director of the Botanical Garden of Buitenzorg, which referred to some matters communicated by me in the above paper. As it was too late to make an addition to the same, I found myself obliged to bring this addendum to the above mentioned paper in the form of a separate note.

I have stated in the " List of Plants of the Maclay-Coast," that the " Kéu " plant collected by me at that coast, has been identified by Dr. Scheffer with the *Piper methysticum* of the South Sea Islands. The note of Dr. Scheffer referred to, brought to my memory the fact, that some days after I received the leaves of the *P. methysticum* from Samoa (in Dec. 1874 (2), and had given them to Dr. Scheffer for comparison with the " Kéu " plant, I found in my ethnological collection some bundles of the " Kéu " which had been presented to me by the natives of the different villages, on my departure, as a supply of " Kéu " for my own use. The bundles consisted of young plants of " Kéu " with roots, stems, branches and leaves, which being bent and tied together when fresh, had been reduced intentionally to small, compact packages suitable for transport. Immersion for a few hours in water made the branchlets and leaves regain partly their former elasticity, so that the leaves could be spread without breaking and used for examination. Finding that the botanical character of the leaves of the "Kéu" plants taken from different bundles, presented some differences, I sent the whole concern (bundles, flattened leaves, &c.), to Dr. Scheffer for complete examination, with the request to tell me by-and-by his opinion: whether all the "Kéu" specimens belonged to the same species (*Piper methysticum*) or not. The same forenoon I received a short note from Dr. Scheffer, written in haste in the Botanical Garden, with the statement that the bundles of "Kéu" contained *two different species of Piper and both different from the Piper methysticum*, but that through the absence of flowers and fruits, it was impossible for him to determine the species. (1) A few days later Dr. Scheffer came to see me, we had a talk about the "Kéu" and, being then (Dec. 1875) on the eve of departure for a new trip to New-Guinea, I promised him to bring some complete specimens (with flowers and fruits) of the different kinds of "Kéu" with me. I collected therefore during my stay at the Maclay-Coast, in 1876-77, with some other plants, also the "Kéu" plant with blossom and fruits, which, according to the promise, I forwarded on my arrival at Singapore to Dr. Scheffer My protracted and very serious illness at Singapore in 1878, during which time it is not unlikely that some letters and papers went astray, may account for the fact, that I never received an answer from Dr. Scheffer. On my arrival in Sydney, in 1878, I quite forgot to write to Dr. Scheffer to ask him about the result of his inspection of the "Kéu" plants and soon afterwards heard with much regret about his death. Although the 2 new (?) species of Piper mentioned by Dr. Scheffer in his note, have possibly not been described by him, the fact that there are on the Maclay-Coast other kinds of Piper, allied to *P. methysticum*, remains, I think proved. (1.)

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(1) "Kéu" is the name given in the dialect of Bongu of the Maclay-Coast, to a species of Piper which is used for the preparation of a stimulating and somewhat intoxicating beverage. As it will be seen from this paper, the name of "Kéu" is applied to more than one species of Piper (of which one is the *Piper methysticum* of Polynesia). The names for the same beverage, as well as for the plants used for its preparation in the other dialects of the Maclay-Coast are :—*Keuva*, *Isse*, *Kial*, *Ayo*, *Segu* and others.

(2) *Vide* my paper : " List of Plants in use by the Natives of the Maclay-Coast." Proceed. Linn. Soc., N.S.W., Vol. X., p. 346.

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(1) The portion of Dr. Scheffer's note referring to the "Kéu" was: " . . . Parmi votre collection de la Nouvelle-Guinée se trouvent *deux* " espéces de Piper, qui sont toutes deux différentes de l'espéce d'Apia. La " nervature est tout autre. Par l'absence de fruits et de fleurs c'est impos- " sible de les determiner." . . .

As the mode of preparation of the "Kéu-beverage" is somewhat different from that of the "Kava" or "Ava" of the Polynesians, which operation has been described more than once by travellers (2) it appears to me that a short account of the way in which the "Kéu" is prepared by the natives of the Maclay-Coast, is here not out of place.

The "Kéu" plant is used not only in its fresh state, but often after it has been kept for weeks and months; leaves, branches, stem and roots are chewed. In case the latter are too hard and large, they are split and beaten with a stone before chewing. Portions of leaves, of broken branches, chips of stem and roots are distributed, amongst boys and young men, who, with their strong healthy teeth, soon reduce them to a soft greenish pulp, which is more or

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(1) I shall mention but a few of them. In W. Mariner's account of the Tonga Islands [An account of the natives of the Tonga Islands from communications of Mr. W. Mariner, by John Martin. Second edition, London, 1818, Vol. II., pp. 173-176] there is a very complete description of the preparation of the "Kava," with all the ceremonies connected with the drinking of it, at the Tonga Island, at the beginning of this century. Capt. J. E. Erskine, R.N., (Journal of a Cruise among the Islands of the Western Pacific. London, 1853, p. 49) gives also an account about the ceremony of the "Ava" drinking at Samoa. Of course, in each book about the South Sea Islands, in each account of travels on the Islands of the Pacific, there are more or less complete descriptions of the preparations, drinking and effects of this peculiar beverage. These descriptions show that different modifications in the use of the "Kava" in the same place have gradually taken place, which however can be explained by the fact that the use of this beverage is generally disappearing with the advance of missionaries, white traders and settlers, and the introduction of spirits.

(2) I wrote to Baron F. von Mueller about the discovery of Dr. Scheffer's note and received a few days ago his answer. The portion of the Baron's letter, referring to the distribution of Piperaceæ, runs (translated from the German) as follows :—"I wish to remark, that Casimiz de Candolle, in his "new work on the Piperaceæ, does not mention any other species of the "genus Piper from New Guinea, but Piper methysticum ; Piper Rumpfii is "nearly allied to P. methysticum, but is only known at Ternate. We "know as well described not more than 5 Piperaceæ from New Guinea ; "but as about 70 species have been found in the Sunda-Island, it is to be "expected that numerous species will be collected by and by in New "Guinea. In fact I have already several in my collections, but the "specimens are very fragmentary, so that nothing or very little can be "done with them. Beccari's Piperaceæ remain still unpublished; it is "possible, however, that he has collected only a few of them."

less saturated with saliva. In the meantime one of the old men has already made the necessary arrangement for filtering the "Kéu" drink. Two large "gambas," (1) specially kept for this purpose, are used. The upper with a hole in the centre serves as a funnel, the lower and larger as a reservoir. The hole on the bottom of the funnel is covered with a layer of young "unan" (a species of Imperata) which has been made soft by rubbing. Having rinsed his hands the old man, remaining seated behind his "gambas," collects the balls (remarkably large) of masticated "Kéu," which are presented to him by the young people, who pass before him in a procession. Sometimes the ball is presented, not on the palm of the hand as usual, but on the outstretched tongue of the chewer.

The balls are deposited by the operator on the bottom of the upper "gamba," which serves for the funnel, a little water is added and the filtration helped by stirring. After a while, when the greater part of the fluid has been filtered through the "unan," the remaining masticated "Kéu" is carefully lifted out of the funnel in the shape of a big ball, and more water poured on it. The ball is compressed with both hands, the greenish infusion draining between the fingers of the operator and running through the funnel into the reservoir. Still more water is poured on the kneaded ball until the paler colour of the infusion shows that this part of the operation is at an end. The empty funnel is lifted and put aside. The reservoir is nearly filled with a dirty-greenish looking fluid of the consistence of a not very thick syrup. Sometimes a little more water is added and the "Kéu" stirred thoroughly.

The "Kéu" is drunk soon after it is made, so that in such a short time no fermentation could be produced by the saliva contained in the mixture (1). The "Kéu" beverage of the Maclay-Coast being, in comparison with the Polynesian "Kava," a very concentrated drink, is taken, very likely, for this reason in comparatively small quantities. Each "Kéu"-drinker carries in his "gun" (2) his own neatly carved "Kéu-gamba," or cup made of the shell of the small kind of cocoanut (with the yellow nuts), which may hold from 2-4 tablespoons full (from about 40-80 grammes) of fluid, and it happens very seldom that more than one cup is drunk by the same man. To lessen the bitter after-taste of the "Kéu," a small quantity of "Munki-la" (3) is taken after the swallowing of the "Kéu." (4)

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(1) The name "gamba" in the dialect of Bongu is given to the shell of the cocoanut, which is split horizontally. A short but strong stroke, with an elongated stone (especially kept for that purpose) given by an experienced hand, splits the nut horizontally, leaving a level border. According to the purpose of the "gamba-maker," the nut can be split in the middle or higher up, and accordingly the "gamba" can be made flat or deep. "Gambas" are used by natives as dishes, plates, etc., etc.

Without doubt, the strength of the "Kéu"-beverage depends upon the part of the plant used for chewing (the root gives the strongest kind of "Kéu"), very likely upon the age of the plant, and of course on the amount of water employed. Therefore the beverage used at different time and in different places is evidently different in its strength, and naturally will produce on the drinker a different effect. As far as I have seen the effects of the "Kéu" upon the "Kéu" drinkers on the Maclay-Coast, I find that I have not sufficient reason for calling the "Kéu" (in the concentration used at that coast) a very intoxicating drink. It is more *a soporific.*

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(1) Prof. H. N. Moseley says the same about the "Kava" as it is made at the Fiji Islands. "The infusion of the pepper-root is not allowed to "stand so as to ferment, but some change probably is effected in the active "principles by the action of the saliva, for grated "Kava," which is now "used in Tonga, by order of the missionaries, as a substitute for the "chewed preparation, is not so good as the latter." (H. N. Moseley. Notes by a Naturalist, on the Challenger, London, 1879, p. 312.) From all the accounts of preparing the "Kava" by other travellers in the South Sea Islands I have read, not one reports that the "Kava" is left to stand so long as to ferment. I have tasted an infusion of grated "Kava" made by the missionaries at Samoa. It was a kind of aromatic water of bitter taste—a rather very indifferent than nice beverage.

(2) "Gun" is a bag carried by the natives slung on a plaited band over the left shoulder. It is an ever-constant companion of the Papuan of the Maclay-Coast, in which he carries all the necessaries of his every-day life.

(3) "Munki-la" is a kind of pap made of the grated kernel of cocoanut steeped in the so-called "cocoanut milk." It is a favourite dish of the natives of that coast.

(4) I have intentionally abstained in this paper from describing all the ceremonies connected with the drinking of the "Kéu." I will however mention, that at the Maclay-Coast it is used only by men, and not daily or many times a day, as it has been the custom on some islands of Polynesia, but on special occasions as reception of visitors, old friends, at feasts, &c.

Regarding the immediate effects of the "Kéu," I will translate a portion of letter written by me some 12 years ago, and published in the "Isvestia" of the Imperial Russian Geographical Society. (1)

"The natives who have drunk their usual portion of "Kéu" " enter soon into a melancholic sleepy state, staggering they retire " from their companions, sit down in some comparatively shady " corner, and stare intently on something round, spit freely, on " account of the bitter taste of the "Kéu" remaining a long time " in the mouth and fall at last into an agitated but heavy sleep. " It is difficult then to wake them and to make them understand " anything. The greater number of men take only such a quantity " of "Kéu" that after dozing for 10 or 20 minutes, they awake " quite themselves again. With the drinking of the "Kéu" the " meal (during a feast) begins. Nothing is eaten before, and the " indulgers of greater quantities of "Kéu" take only the same and " eat nothing, because they fall asleep for hours. I never saw the " "Kéu" make the natives noisy, or quarrelsome—very likely the " stuff acts too quickly, at all events the effects of the "Kéu" are " very different from those of alcohol."

Wishing to know by my own experience the taste and the effects of the "Kéu" and finding with Capt. (now Admiral) I. E. Erskine, R.N., that "its preparation is not so disgusting as the accounts of some travellers had led me to expect," (Loc. cit., p. 49), I took once, during my first stay at the Maclay-Coast (in 1871 and '72), a dose (equal to an average portion usually taken by natives), about sixty grammes. The stuff was without a special scent, of a bitter and astringent taste, and a bitter and slightly aromatic after-taste. About 10 minutes after taking the "Kéu," I felt giddy and my legs objected to hold me. I was glad to find that I could sit down where I was standing, and felt that I could not resist sleep. After half-an-hour's sleep I was all right again. I did not care to repeat the trial.

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(1) "Isvestia" of the Imp. Russ. Geograp. Soc., Vol. X., 1874, p. 85.

The natives on the Maclay-Coast never complained to me about any bad effects of prolonged excessive use of the Kéu-drink, effects something like the Tahitian "arevareva." (1)

As the use of the "Kava," on the islands of the Pacific, is, as far as we know, a very ancient custom, it appears to me of importance, for Ethnology and Ethnography, that the distribution of this custom on the islands should be carefully recorded, especially, as the same is gradually disappearing before the invasion of the white man. (2) Such records of the use of the plant, of the mode of preparation of the beverage, the ceremonies connected with the drinking of the same, may lead to the solving of interesting ethnographical questions.

According to Gerland (3), the use of the "Kava" has been known on all the Islands of Polynesia, with the exception of Mangareva Ar^{go}, and New Zealand (4); in both cases, as Gerland supposes, because, the emigrants to these Islands, when emigrating have not imported the plant with them and have not found the same in their new homes.

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(1) The daily use of the drug "Kava" is sometimes followed by a kind of skin disease, called in Tahiti "arevareva." The effect on those who are addicted to the use of "Kava" for any length of time is to produce obscurity of vision, red conjunctiva, and yellow colouration of the teeth, while the skin, where thick, becomes dry, scaly, cracked and ulcerated, and the body becomes emaciated and decrepit. ("Kava" in the Encyclopædia Britannica, Vol. XIV. of the 9th edition, p. 18.) The scars produced by the ulcers of "arevareva" were regarded on many islands of the Pacific as "marks of honour," because only people of rank could indulge freely in the use of "Kava." (*Waitz* and *Gerland*. Anthropologie der Naturvölker, 6er Theil. Die Völker der Südsee. Dritte Abtheilung. Leipzig, 1872, p. 60.)

(2) Mariner, when he was at Wahoo (Sandwich Islands), in the beginning of this century saw the "Kava" drunk twice as a luxury, and was told that several of the old men still preferred it to spirit. Four years later Campbell (Voyage Round the World) never saw the "Ava" employed (at the Sandwich Islands) but as a medicine to prevent corpulency, ardent spirits being adopted as a luxury instead of it. (W. Mariner's account of the Tonga Islands, compiled and arranged by John Martin, M.D. London, 1818, Vol. I., p. XLIX.)

(3) *Waitz Gerland*. Loc. cit., 6ter. Th., pp. 59, 60, 61.

(4) In New Zealand the name "Kawa" is given to another species of Piper—the Piper excelsum. *Waitz Gerland*, Loc. cit., p. 60.

On the Islands of Micronesia, according to Gerland (1), the use of the "Kava" has been known at the Islands Kusaie, Ponape, and Truck, and was called the "Saka" beverage, but on these Islands the root was not chewed but ground between stones.

In Melanesia the use of the "Kava" has been recorded: in Fiji, introduced from Tonga (2), in some Islands of the New-Hebrides (as Tanna, Tate, Aneityum and Gera), where this custom is also of Polynesian origin. (3)

How the use of the "Kéu" became known to the natives of the Maclay-Coast, remains still to be found out.

As already mentioned in a former paper (4), the use of the Kéu-beverage is not adopted in all the villages of that coast, although the plant is known. In the same paper, I had the opportunity of stating the information from the Rev. W. G. Lawes, that the Piper methysticum grows wild on the south-east of New-Guinea without the natives knowing or making use of it. Rev. G. Brown wrote to me a few days ago about a similar case in New Britain and New Ireland, and the Solomon Islands, where the Piper methysticum (or an allied species) grows wild, but the natives don't know the use of it. (5)

It is not uninteresting, that in Polynesia the plant and the beverage prepared from it, are called "Kava" (Tonga, Rarotonga, New Zealand, Marquesas), and "Ava" (Samoa and Hawaii), in Micronesia, "Saka," in Fiji-"Yagona," whilst at the Maclay-Coast, the same, or an allied plant is known under many names, as "Kéu," "Keuva," "Isse," "Kial," "Ayo," "Segu," and very likely many more.

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(1) *Waitz Gerland.* Loc. cit., Vter. Theil., zweite Abtheil., p. 78.

(2) *Erskine.* Loc. cit., p. 263.

(3) *Waitz-Gerland.* VIter. Th. Dritte Abtheil, p. 578.

(4) List of plants in use by the natives of the Maclay-Coast

(5) Here the portion of Rev. G. Brown's letter to me referring to the subject:—"I have *not* seen the natives of New Briton, New Ireland, or "the Solomons use the "Kava," nor do they know its use though it grows "there. I got large roots of it, and natives from other islands said it was "the true "Kava," but not being cultivated it was coarse, and as they "soon began to use the Betel nut as the other natives, they did not use it."

Before I close this note, I may add, that since 1857, the root of the Piper methysticum has been recommended in Europe for medicinal use, and it appears that it will become a valuable medicine. (1) The fluid extract made with alcohol as a menstrum, has been used in bronchitis, rheumatism, gout, gonorrhœa, gleet, &c.: the chief medical use of "Kava" is however to cure chronic cysticis and gleet. (2). More investigation and experiments on the effects of the "Kava" extract are still desirable.

NOTES AND EXHIBITS.

Mr. Brazier exhibited a specimen of *Paryphanta Hochstetteri*, a shell which he had exhibited at the August meeting, showing the remarkable effect produced by the heat a few days ago. The shell was completely splintered into about 50 pieces, nothing remaining but the whorls and the umbilicus. He said that he had often observed Bulimi throwing off the epidermis from heat, but had never before seen an instance of a shell flying to pieces from that cause.

Mr. Ogilby exhibited a specimen mounted by Mr. Whitelegge for the microscope, of *Branchiostoma bassanum,* Gunther, dredged off North Head.

Mr. Palmer exhibited a species of *Coccinella*, which had in a few days cleared his peach trees of an attack of Aphides, which threatened their destruction. Also specimens of *Anoplognathus inustus* in the cocoon, but completely formed, and a beautiful chrysalis, probably of a *Danais*, suspended from a fern leaf.

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(1) I am indebted to Mr. F. Wright for having drawn my attention to this fact.

(2) Details about the constituents of the drug and its medicinal use, &c., &c., *vide*:—The National Dispensatory, by A. Stillé and J. Maisch, 3rd. ed., London, 1884, pp. 964, 965. A companion to the U. S. Pharmacopœia, by Oscar Olberg and Otto Wall. London, 1884, pp. 696, 697. Novel Counter Adjunct bearing chemist's own name and address, with notes on recent materia medica. Evans Lescher and Webb, 1884.

Mr. Palmer also exhibited two Mogos or Stone Axes of a very rough description, found a little below the surface in a cavity of the sandstone on the Blue Mountains.

Dr. von Lendenfeld exhibited specimens of the sponges and discoloured labels referred to in his paper on *Halme tingens*.

Mr. C. S. Wilkinson exhibited a small fish brought by Mr. H. T. Wilkinson, J.P., from Lord Howe Island; also from the same Island a fine specimen of *Dolium variegatum* which Mr. Brazier stated had not hitherto been found so far to the east of Australia, Mr. Macleay and Mr. Ogilby considered the fish to be a new genus, and Mr. Macleay undertook to examine and describe it.

Mr. Wilkinson also exhibited a seed-pod of the *Cassia fistula* from the Solomon Islands.

WEDNESDAY, 25TH NOVEMBER, 1885.

The President, Professor W. J. Stephens, M.A., F.G.S., in the chair.

DONATIONS.

"Smithsonian Miscellaneous Collections." Vols. XIII.-XXVII. "Smithsonian Report," 1880, 1881, 1882. "Reports of Professor Henry," 1866-1878. "Review of American Birds." Part 1. By Spencer F. Baird. "Catalogue of North American Birds." By Spencer F. Baird. "New species of North American Coleoptera." By John L. Leconte, M.D. Parts 1 and 2. "List of the Coleoptera of North America." By John L. Leconte, M.D. "Catalogue of the Fishes of the East-coast of North America." By Theodore Gill, M.D., Ph.D. "Arrangement of the Families of Mammals." By Theodore Gill, M.D., Ph.D. "Arrangement of the Families of Mollusks." By Theodore Gill, M.D., Ph.D. "Catalogue of the Orthoptera of North America." By S. H. Scudder. "Check-list of the Invertebrate Fossils of North America," Miocene. By F. B. Meek. "Check-list of the Invertebrate Fossils of North America," Eocene and Oligocene. By T. A. Conrad. "Sketch of the Life and Contributions to Science of Prof. Joseph Henry, LL.D," (4 copies.) "An Account of Progress in Botany in the year 1881." By Prof. William G. Farlow. "Nereis Boreali-Americana; or, Contributions to the Marine Algæ of North America." Part 3. By William Henry Harvey, M.D., F.L.S. "A Memoir on the Extinct Sloth Tribe of North America." By Joseph Leidy, M.D. "Tuckahoe; or, Indian Bread." By Prof. J. Howard Gore. "First Annual Report of the Bureau of

Ethnology," 1879-1880. By J. W. Powell, Director. "Report on the Pharmacopœias of all Nations." By Dr. James M. Flint, (2 copies.) "The Botany of Bermuda." By General Sir John H. Lefroy, F.R.S., (2 copies.) "Catalogue of Publications of the Smithsonian Institution," (1846-1882.) "Bulletin of the U. S. National Museum," Nos. 1, 2, 3, 25 and 26. From the Smithsonian Institution.

"Bulletins de l'Academie Impériale des Sciences de St. Petersbourg." Tome XXIX., Nos. 2, 3 and 4. "Mémoires." Tome XXXII., Nos. 4-13. From the Academy.

"Acta Societatis Scientiarum Fennicæ." Tome XIII., 1884. "Ofversigt af finska Vetenskaps Societétens." Forhandlingar XXV., 1882-1883. From the Society.

"Victorian Naturalist." Vol. II., No. 7, November 1885. From the Field Naturalists' Club of Victoria.

"Report of the Board of Governors of the Public Library, Museum and Art Gallery of South Australia." 1884-1885. From the Director.

"Feuille des jeunes Naturalistes." No. 180, 1st October, 1885. From the Editor.

"Comptes Rendus des Séances de l'Academie des Sciences." Paris, January 1885-August 1885. "Bulletin Astronomique." Tome I., 1884. From the Academy.

"The Provincial Medical Journal." Vol. IV., No. 46, 1st October, 1885. From the Editor.

"Annual Report of the Trustees of the Australian Museum for 1884." From the Trustees.

"Science." Vol. VI., Nos. 137-140, September 9th, October 4th, 1885. From the Editor.

"Zoologischer Anzeiger." No. 205, 5th Cctober, 1885. From the Editor.

From the Naturhistoriches Museum zu Hamburg "Bericht des Direktor." 1885.

From K. F. Koehler's Antiquarium in Leipzig "Catalog." No. 428.

PAPERS READ

A LIST OF THE TROGOSITIDÆ OF AUSTRALIA, WITH NOTES AND DESCRIPTIONS OF NEW SPECIES.

By A. Sidney Olliff, F.E.S.,

Assistant Zoologist, Australian Museum.

Like the "List of the Cucujidæ" the following Paper, although embracing all the species at present known to me as inhabiting Australia, must be considered only as an instalment of what careful searching will no doubt reveal. Of the twenty-eight species here enumerated ten are added to the Australian fauna; of these eight are described as new, the remaining two probably introduced species, *Latolæva cassidoides* and *Lophocateres Ivani*, being for the first time recorded as Australian.

The most important paper on this family which has appeared since the publication of the Munich Catalogue is Herr Edmund Reitter's "Systematische Eintheilung der Trogositidæ" published in the somewhat inaccessible "Verhandlungen" of Brünn. As I believe my copy of this paper, which I received through the courtesy of the author, is the only one to be found in Sydney I have reproduced the diagnoses of the Australian species and added the characters of the genera after a careful examination of the specimens in my own possession.

Of the genera, as yet detected in Australia, the largest and at the same time the most characteristic is *Leperina*, of which eleven species have already been described. The second is *Ancyrona*, but as the genus is widely distributed and liable to accidental diffusion I attach but little importance to this fact.

The following table showing the geographical distribution of the family is chiefly based on an examination of the specimens in the collections of the Hon. William Macleay and the Australian Museum :—

	Name of Species.	Australia, no exact locality.	Cape York and N. Australia.	Port Denison.	Rockhampton, Dist.	Wide Bay & Moreton Bay Dist.	Rich. and Clar. R. Dist.	Hunter R. Dist.	Sydney Dist.	Illawarra and Monaro Dist.	N. S. Wales.	Victoria.	South Australia.	West Australia.	Tasmania.	Norfolk Island.
1.	Egolia variegata, *Erich.*	...	...	...	...	...	...	...	...	...	...	...	...	...	*	...
2.	Tenebrioides mauritanica, *Linn.*	...	*	...	*	...	*	...	*	...	*	*	...	...	*	...
3.	,, punctulata, *Reitt* ...	...	...	...	...	...	...	...	...	...	...	...	*	...	...	...
4.	Cymba monilata, *Pasc.*	*	...	...	...	...	...	...	...	...	...	...	...	...	...	...
5.	Leperina decorata, *Erich.*	...	...	...	...	*	*	...	...	...	*	*	*	...	*	...
6.	,, seposita, *Olliff.*	...	...	...	...	...	...	...	...	...	...	...	...	*	...	...
7.	,, adusta, *Pasc.*	...	...	...	...	...	...	...	...	*	*	*	*	...	...	...
8.	,, opatroides, *Lév.*	...	*	...	...	...	...	...	...	...	...	...	...	...	...	...
9.	,, conspicua, *Olliff.*	...	*	...	...	...	...	...	...	...	...	...	...	...	...	...
10.	,, turbata, *Pasc.*	...	...	*	...	*	*	...	*	*	*	...	...	...	...	*
11.	,, Mastersi, *Macleay.* ...	...	...	...	...	*	...	...	...	...	...	...	...	...	...	...
12.	,, cirrosa, *Pasc.*	...	*	*	*	*	...	...	...	...	...	...	...	...	...	...
13.	,, burnettensis, *Macleay*...	...	...	...	*	*	...	...	...	...	...	...	...	...	...	...
14.	,, lacera, *Pasc.*	...	...	...	...	*	...	...	...	*	*	*	*	...	...	...
15.	,, fraterna, *Olliff.*... ...	...	...	...	...	...	...	...	...	...	...	...	...	*	...	...
16.	Peltonyxa Deyrollei, *Reitt.* ...	...	...	...	...	...	...	...	*	...	*	...	...	...	...	...
17.	Neaspis variegata, *Macleay.* ...	...	...	...	...	*	*	...	*	*	*	*	...	...	...	...
18.	,, villosa, *Pasc.*...	*	...	...	...	...	...	...	...	...	...	...	...	...	...	...
19.	,, sculpturata, *Reitt.* ...	...	...	...	...	...	...	...	...	...	...	*	...	...	...	...
20.	Latolæva cassidoides, *Reitt.* ...	...	*	...	...	...	...	...	...	...	...	...	...	...	...	...
21.	Ancyrona laticeps, *Olliff.*	...	...	...	...	*	...	...	*	...	*	...	...	...	...	...
22.	,, ægra, *Olliff.*	...	...	...	...	...	...	...	*	...	*	...	...	...	...	...
23.	,, Gestroi, *Reitt.*	...	*	...	...	...	...	...	...	...	...	...	...	...	...	...
24.	,, latebrosa, *Olliff.*	...	...	...	...	*	...	...	...	...	...	...	...	...	...	...
25.	,, amica, *Olliff.*	...	...	...	...	...	...	...	...	...	...	...	*	*	...	...
26.	,, vesca, *Olliff.*	...	...	...	...	...	...	...	...	*	*	...	*	*	...	...
27.	Peltoschema filicornis, *Reitt.* ...	*	...	...	...	...	...	...	...	...	...	...	...	...	...	...
28.	Lophocateres Ivani, *Allib.*	...	...	...	...	...	...	...	*	...	*	...	...	...	...	...

Family. TROGOSITIDÆ.

Sub-Family. I. NEMOSOMINÆ.

EGOLIA.

Erichson, Wiegm. Archiv, I., p. 180 (1842).

1. EGOLIA VARIEGATA.

Egolia variegata, Erichson, Wiegm. Archiv. I., p. 151, pl. 5, fig. 6 (1842).

Lacordaire, Gen. Col. Atlas, pl. 19, fig. 1.

Tasmania.

Sub-Family. II. TROGOSITINÆ.

TENEBRIOIDES.

Piller and Mitterp. (*teste* Reitter).

2. TENEBRIOIDES MAURITANICA. (A.M.)

Tenebrio mauritanica, Linneus, Syst. Nat. I., p. 674 (1767).

Trogosita mauritanica, Jacq. Duv., Gen. Col., II., pl. 42, fig. 208.

Cape York, Endeavour River, Duaringa, Queensland ; Clarence River, Sydney, New South Wales ; Victoria ; Tasmania.

This cosmopolitan species has completely established itself in many parts of Australia, where it is found in granaries, corn bins, flour, &c., as commonly as in Europe. Mr. Macleay (Proc. Ent. Soc., N. S. W., I., p. XXI., 1863) has recorded the fact of his finding large numbers of this insect in one of his insect cabinets, where they appeared to be doing considerable damage.

3. TENEBRIOIDES PUNCTULATA.

Tenebrioides punctulata, Reitter, Verh. ver. Brünn, XIII., p. 74 (1875).

South Australia.

I have not been able to see the description of this species. In the "Zoological Record" for 1875 it is stated to come from Cuba and Portorico as well as from the above locality.

Sub-family. III. LEPERINÆ.

CYMBA.

Seydlitz, Fauna Baltica, p. 34 (1872).

4. CYMBA MONILATA.

Peltis monilata Pascoe, Ann. Mag. Nat. Hist. (4) X, p. 318 (1872).

Australia.

As this species is unknown to me, I merely follow Reitter in referring it to the genus *Cymba*, of which the type is the European *Peltis procera* of Kraatz.

LEPERINA.

Erichson, Germ. Zeitschr. V., p. 453 (1844).

This very natural genus is largely represented in Australia. The species are found under bark and are rather local, but usually abundant where they occur.

I would here point out that these insects should be killed with the fumes of chloroform or ammonia and pinned immediately, as their scales and elytral fascicles are very easily abraded. Specimens which have been preserved in alcohol are generally unfit for identification.

Section 1—*Elytra without fascicles.*

5. LEPERINA DECORATA. (A. M.)

Trogosita decorata, Erichson, Wiegm. Archiv., I., p. 150 (1842).

Leperina decorata, Lacordaire, Gen. Atlas, pl. 19, fig. 5.

Leperina gayndahensis, Macleay, Trans. Ent. Soc., N. S. Wales II., p. 164 (1871).

Gayndah, Wide Bay, Queensland; Clarence River, N. S. Wales; Port Lincoln, South Australia; Victoria; Tasmania.

I have satisfied myself after a careful examination of a long series that the specimens from Gayndah in the collection of the Australian Museum are only abraded examples of this abundant species.

6. LEPERINA SEPOSITA, sp. n. (A. M.)

Oblong, pitchy black, somewhat shining; head and prothorax strongly and closely punctured, the latter with a small patch of rusty red scales at the posterior angles, the sides strongly rounded, a moderately deep longitudinal impression on each side of the median line; elytra costate, the interstices broad, very strongly and closely punctured, and furnished with four or more rather large patches of rusty red scales.

Head rather broad, irregularly strigose-punctate and somewhat depressed in the middle. Antennæ pitchy red, the basal joint considerably enlarged and rather strongly punctured. Prothorax rather strongly emarginate in front, the sides strongly rounded and narrowly reflexed, the posterior angles obtuse, a small patch of rusty red scales at the anterior angle, another at the middle, and a third much larger patch at the posterior angle. Scutellum broad, rounded behind, closely and strongly punctured. Elytra about twice as long as the head and prothorax together, the sides almost parallel for two-thirds of their length, then gradually rounded to the apex: each elytron with three distinct costæ, the first two extending to the apical margin, the third effaced posteriorly; there is a slight indication of a fourth costa at the humeral angle, the interstices are strongly, irregularly, and very closely punctured; the lateral margin and each of the interstices is furnished with a row of rather large patches of scales, these patches vary from four to six in number and are easily abraded. Underside coloured as above; prosternum strongly and not very closely punctured; meso and metasternum equally strongly and much more closely punctured; abdominal segments finely and very closely punctured. Legs pitchy, closely punctured. Length, 7½-11 mm; greatest width 3-4 mm.

King George's Sound, West Australia.

Easily distinguished from all the other species of the genus by the patches of scales on its elytra; by its strongly rounded prothorax; and by its closely punctured surface. It belongs to the section of the genus in which the elytral fascicles are absent.

7. LEPERINA ADUSTA. (A. M.)

Leperina adusta, Pascoe, Journal of Entom. I., p. 100 (1860).

Bombala, Gunning, Monaro, New South Wales; Melbourne, Victoria; South Australia.

As in the case of *Leperina opatroides* the ground colour of the elytra in this species varies from a pale grey to a rich rust colour. An example from Gunning has the prothorax a little broader and the markings larger than the other specimens.

8. LEPERINA OPATROIDES, (A. M.)

Leperina opatroides Léveillé, Ann. Mus. Genov. (2) I., p. 637 (1884).

Cape York, Somerset, North Australia.

If I have correctly identified this species, which M. Léveillé records from Yule Island and New Guinea, as well as from the above localities, the scales on the elytra composing the ground colour vary in tint. In some specimens they are pale grey and in others a rich brown.

9. LEPERINA CONSPICUA, sp. n. (A. M.)

Oblong, slightly narrower in front than behind, dark piceous, covered with black scales; prothorax about twice as broad as long, with three irregular patches of white scales on the disc, the sides thickly covered with broad white scales; elytra crenate-striate, the interstices rather broad, with elongate patches of white scales on the disc and at the margins behind the middle, a narrow fascia of white scales near the apex.

Head moderately closely covered with black scales, with which a few reddish brown ones are intermingled. Antennæ reddish brown, the club three jointed. Prothorax deeply emarginate in front, the sides rounded and very slightly constricted at the base, with three oblique patches of white scales on the disc, two just before the middle and one somewhat smaller and narrower just before the base, the lateral margins rather broadly banded with white scales. Scutellum transverse, rounded behind, black. Elytra rather more than twice as long as the head and prothorax together, slightly narrower in front than behind, finely crenate-striate, the interstices rather broad, the disc ornamented with elongate patches of white scales which are contained within the interstices, a small white spot near the humeral angle, a narrow curved fascia near the base and a row of five or six spots situated at the margin on each side behind the middle also composed of white scales; the suture free from scales. Underside ferruginous, moderately closely covered with fine scales and pubescence; sterna finely rugose-punctate, the abdominal segments finely and closely punctured. Legs ferruginous. Length 7½-9 mm.; greatest width 4-4½ mm.

Lizard Island, North Australia.

Of this very distinct species I have three specimens before me, all agreeing in the position and general appearance of the elytral spots, but differing to some slight extent in their number and size. One specimen has the markings on the prothorax composed of pale reddish brown instead of white scales. *Leperina conspicua* may be distinguished from the preceding species, not only by its different colour and markings, but also in having the anterior angles of the prothorax less rounded internally, the elytral interstices slightly broader and the suture free from scales.

Section 2—*Elytra with six or more fascicles.*

10. LEPERINA TURBATA. (A.M.)

Leperina turbata, Pascoe, Journal of Entom. II, p. 29 (1863.)

Leperina fasciculata, Redtenbacher, Reise Novara II, p. 37, pl. 2, fig. 3 (1867.)

Port Denison, Moreton Bay, Queensland; Clarence River, Rope's Creek, Illawarra, New South Wales; Norfolk Island.

Herr Reitter (Verh. ver. Brünn XIV., p. 36, 1876) placed this species as a synonym of *Leperina Signoreti*, Montr. from New Caledonia, a species with which it certainly has no connection. M. Léveillé (Bull. Soc. Ent. Fr. (5) VII, p. CXII) has already pointed out this error.

11. LEPERINA MASTERSI. (A.M.)

Leperina Mastersi, Macleay, Trans. Ent. Soc. N. S. Wales II, p. 163 (1871).

Gayndah, Queensland.

Nearly allied to *Leperina turbata*, which it resembles in form and colour; head more closely and less strongly punctured; prothorax moderately strongly and not very closely punctured, the sides distinctly constricted just before the posterior angles, the median line only slightly elevated; the elytral fascicles much less raised, and the abdominal segments not as strongly punctured as in the allied species.

12. LEPERINA CIRROSA. (A.M.)

Leperina cirrosa, Pascoe, Journal of Entom. I., p. 100 (1860).

Percy Island, Endeavour River, Port Denison, Rockhampton. Maryborough, Wide Bay, Moreton Bay, Queensland.

This species is remarkable for the great length of the white scales on the sides of the protborax and the large size of the elytral fascicles.

13. LEPERINA BURNETTENSIS. (A.M.)

Leperina burnettensis, Macleay, Trans. Ent. Soc., N. S. Wales, II., p. 164 (1871).

Rockhampton, Gayndah, Queensland.

Closely allied to *Leperina cirrosa*—indeed I think it very possible that when more specimens are available for comparison they will prove to be extreme varieties of a single very plastic species. The two specimens before me, one of which is the type, differ from *Leperina cirrosa* in their smaller size, in having the fascicles on the prothorax and elytra comparatively smaller and the appressed white scales on the sides of the former shorter and less numerous; the abdominal segments are rather more closely and regularly punctured.

14. LEPERINA LACERA. (A.M.)

Leperina lacera, Pascoe, Journal of Entom, p. 101 (1860).

Gayndah, Queensland; Jerrawa, Jugiong, Clyde River, Monaro, New South Wales; Melbourne, Victoria; Adelaide, South Australia.

This species varies considerably in size (8-13 mm.) and in the punctuation of the prothorax. In some specimens the disc on each side of the smooth median line is strongly and closely punctured whilst in others the disc is shining and the punctures much less dense. A small specimen from Gayndah in the collection of the Australian Museum appears to bear the same relation to this species as *Leperina burnettensis* does to *L. cirrosa*. It has the scales on the prothorax and the elytral fascicles less conspicuous than those of the typical form. As it is not in a very good state of preservation I prefer to regard it as a variety at all events for the present.

15. LEPERINA FRATERNA, sp. n. (A. M.)

Oblong, piceous, thickly covered with black scales, intermingled with white and pale reddish-brown ones; prothorax a little more than one and a-half times as broad as long, the sides strongly rounded; elytra finely costate, with three fascicles on each side composed of black spatuliform scales, the first near the humeral angle, the other two situated in the first interstice—one about the middle and the other just before the apex.

Head rather strongly and closely punctured, with a small black fascicle on the inner margin of each of the eyes. Antennæ dark ferruginous. Prothorax irregularly and rather closely punctured, with a smooth and slightly elevated median line, two indistinct fascicles on each side considerably before the middle; anterior angles rounded. Scutellum rounded behind. Elytra narrower in front than behind, finely costate, the interstices rather broad, moderately strongly and very irregularly punctured, with several small fascicles situated in the first, second and third interstices. Underside ferruginous; prosternum impunctate in the middle, finely rugose at the sides; mesosternum metasternum and abdominal segments strongly, closely and very irregularly punctured. Legs dark ferruginous. Length 9-12 mm.; greatest width 3¾-5 mm.

Salt River, West Australia.

Very near *Leperina lacera*, but separated by its narrower and more elongate form, strongly rounded prothorax and in having the fascicles on the elytra less conspicuous; the sides of the prothorax are clothed with a few dingy white scales very unlike the dense mass of appressed scales with which the prothorax of *L. lacera* is provided.

Sub-Family. IV. PELTINÆ.

The following are the chief characters of the genera of this sub-family.

A. Antennæ with nine joints .... *Peltonyxa*
B. Antennæ with ten joints.
  a. Claws very slightly dentate .... *Neaspis*
  b. Claws dentate
  aa. Body almost glabrous. Prosternum very slightly dilated behind the coxæ, the apex rounded............ *Latolæva*
  bb. Body densely pubescent or clothed with scales. Prosternum dilated behind the coxæ, the apex triangular. *Ancyrona*
C. Antennæ with eleven joints.
  a. Antennæ with a gradually formed three-jointed club. *Lophocateres*
  b. Antennæ filiform, only slightly thickened towards the extremity. .... *Peltoschema*

PELTONYXA.

Reitter, Verh. ver. Brünn XIV, p. 46 (1876).

Body elongate, very slightly pubescent. Head truncate in front, slightly emarginate on each side, with a transverse impression on the disc between the antennæ. Antennæ nine jointed, the first joint very much, the second slightly thickened, the club three-jointed. Prothorax scarcely emarginate in front, the anterior angles only slightly produced. Elytra punctate-striate. Prosternum between the coxæ narrow, the apex not dilated.

16. PELTONYXA DEYROLLEI. (A.M.)

Peltonyxa Deyrollei, Reitter, Verh. ver. Brünn, XIV., p. 46 (1876).

Lane Cove, Sydney, New South Wales.

Herr Reitter's description of this species is as follows:—"Elongata, levissime subconvexa, fusco-ferruginea, subtus ferrugineo-testacea, subopaca, vix perspicue pubescens; capite thoraceque obsolete punctatis, hoc lateribus paullo dilutiore, elytris elongatis, striato-punctatis, interstitiis alternis elevatis. Long. 4.2 mm."

NEASPIS.

Pascoe, Ann. Mag. Nat. Hist. (4), X., p. 317 (1872).

17. NEASPIS VARIEGATA,. (A.M.)

Soronia variegata, Macleay, Trans. Ent. Soc., N. S. Wales, II., p. 161 (1873).

Neaspis subtrifasciata, Reitter, Verh. ver. Brünn, XIV., p. 47 (1876).

Gayndah, Ipswich, Queensland; Clarence River, Lane Cove, Sydney, Bowenfels, Port Hacking, Illawarra, Bombala, Gundagai, New South Wales; Melbourne, Victoria.

I have little doubt that the above synonymy is correct. The type of *Soronia variegata* in the collection of the Australian Museum agrees in every particular with the description of *Neaspis subtrifasciata*. This insect is abundant in the neighbourhood of Sydney.

18. NEASPIS VILLOSA.

Neaspis villosa, Pascoe, Ann. Mag. Nat. Hist. (4), X., p. 318 (1872).

Australia.

19. NEASPIS SCULPTURATA.

Neaspis sculpturata, Reitter, Verh. ver. Brünn XIV., p. 48, pl. 2, fig. 29 (1876).

"Elongato-ovalis, nitida, nigra, lateribus prothoracis elytrorumque, antennis, pedibus, corpore infra ferrugineis, supra setulis albidis et nigris brevibus subsquamulosis minus dense variegatis, capite thoraceque parce fortiter, minus profunde punctatis, interstitiis punctorum subtilissime dense punctulatis; lateribus thoracis elytrorumque subtiliter lanuginoso-ciliatis, his dense æqualiter punctato-striatis, interstitiis angustissimis leviter elevatis et dense interruptis, alternis paullo magis elevatis. Long. 4.5 mm."

Melbourne, Victoria.

LATOLÆVA.

Reitter, Verh. ver. Brünn XIV., p. 49 (1876).

Body broadly ovate, almost glabrous or clothed with short inconspicuous pubescence. Head somewhat dentate in the middle. Antennæ ten jointed, the club three jointed and loosely articulated. Prosternum behind the coxæ very slightly dilated, rounded at the apex.

20. LATOLÆVA CASSIDOIDES. (A. M.)

Latolæva cassidoides, Reitter, Verh. ver. Brünn XIV., p. 50 (1876).

Cape York, Endeavour River, Queensland.

Specimens from the above localities appear to agree with this Malaccan species, which is probably of very wide range. The following is Herr Reitter's description :—

Breviter-ovalis, depressa, nitida, ferruginea, oculis nigris, parce haud perspicue nigro pubescens, capite crebre fortiter punctato, prothorace antice angustato, minus dense sat profunde punctato ; elytris subparallelis, apice rotundatis, lateribus minus valde explanatis, dorso elevato-sublineatis, interstitiis sat profunde biseriatim punctatis. Long. 7, lat. 4 mm.

ANCYRONA.

Reitter. Verh. ver. Brünn XIV., p. 51 (1876).

Body broad, densely pubescent or clothed with scales. Head scarcely dentate in the middle. Antennæ ten jointed, the club three jointed and loosely articulated. Prosternum behind the coxæ triangularly dilated.

Section 1. *Elytra punctate-striate or striate-punctate.*

21. ANCYRONA LATICEPS, sp. n. (A.M.)

Elongate-ovate, depressed, narrower in front than behind, ferruginous, shining, thickly covered with long woolly pubescence; head and prothorax strongly and rather closely punctured, the former very broad; elytra with feebly raised costæ, the interstices broad and provided with two rows of rather large punctures.

Head transverse, more than one and a-half times as broad as long, rather closely covered with elongated punctures. Antennæ testaceous, the club composed of three loosely articulated joints. Prothorax at the base considerably more than twice as broad as long, narrowed and rather deeply emarginate in front; anterior angles rounded, prominent; lateral margins reflexed, rather broad, moderately strongly and closely punctured. Scutellum transverse, rounded behind, finely punctured. Elytra about twice as long as the head and prothorax together, narrower in front than behind, the suture slightly raised; each elytron with six feebly raised costæ which extend to just before the apex, the interstices broad and provided with two rows of rather large punctures; lateral margins broad, reflexed, finely and closely punctured, clothed with long yellowish pubescence. Underside reddish testaceous, shining, very feebly and sparingly punctured; under-margins of the elytra pale ferruginous. Legs reddish testaceous, knees and claws darker. Length 5-6½ mm.; greatest width 3-3½ mm.

Wide Bay, Queensland; Lane Cove, Sydney, New South Wales.

The elongated form of this species, in conjunction with its long erect pubescence, its ovate and rather deeply punctured elytra, and its broad head, will serve to distinguish it from all the known species of the genus.

22. ANCYRONA ÆGRA, sp. n. (A. M.)

Ovate, somewhat depressed, slightly broader in front than behind, pale ferruginous, shining, densely clothed with short yellow pubescence; head and prothorax moderately strongly and not very closely punctured; elytra distinctly but not very strongly punctate-striate, the alternate interstices feebly raised.

Antennæ reddish testaceous, the club composed of three loosely articulated joints. Prothorax at the base more than twice as long as broad, considerably narrowed and rather deeply emarginate in front; lateral margins rather broad, strongly reflexed and finely punctured. Scutellum rounded behind, finely punctured. Elytra about twice as long as the head and prothorax together, distinctly and not very strongly punctate-striate, the interstices narrow and alternately raised; lateral margins moderately broad, reflexed, finely punctured and clothed with short yellow pubescence.

Underside reddish testaceous, sterna and abdominal segments extremely finely and sparingly punctured. Legs reddish testaceous. Length 4 mm.; greatest width 2½ mm.

Lane Cove, Sydney, New South Wales.

Readily known by its small size, by the punctuation of its elytra (which are arcuately narrowed behind) and by its finely pubescent surface.

23. ANCYRONA GESTROI.

Ancyrona Gestroi, Reitter, Ann. Mus. Genov., XV., p. 459 (1880).

Somerset, North Australia; also recorded from New Guinea.

24. ANCYRONA LATEBROSA, sp. n. (A.M.)

Broadly ovate, ferruginous, somewhat shining, thickly clothed with short grey and black pubescence; head and prothorax finely and not very closely punctured; elytra moderately strongly punctate-striate, the alternate interstices slightly elevated: each elytron with an indistinct black fascia near the base, and another narrower and even less distinct fascia just before the apex.

Head transverse. Antennæ reddish testaceous, the club composed of three loosely articulated joints. Prothorax at the base about twice the width of the head, considerably narrowed and moderately emarginate in front; the anterior and posterior angles rounded; the lateral margins broad, reflexed and finely punctured. Scutellum transverse, rounded behind, clothed with pubescence. Elytra about twice the length of the head and prothorax together, moderately strongly punctate-striate, the interstices narrow and alternately raised; lateral margins moderately broad, reflexed. Underside of the head and prosternum ferruginous, the latter very finely and sparingly punctured; mesosternum, metasternum and abdominal segments testaceous, finely and not very closely punctured. Legs testaceous. Length 5 mm.; greatest width 2½ mm.

Wide Bay, Queensland.

A very distinct species apparently belonging to the same section of the genus as the Japanese *Ancyrona Lewisi* of Reitter.

Section 2—*Elytra irregularly punctured.*

25. Ancyrona amica, sp. n. (A. M.)

Ovate, depressed, dark ferruginous brown, shining, finely, rather closely and irregularly punctured; head and prothorax moderately closely covered with grey scales and very fine pubescence; each elytron with an indistinct reddish testaceous marking near the suture extending from the base to just behind the middle, where it is bent inwards, the scales forming regular rows on the disc.

Head rather small, transverse. Antennæ ferruginous, the club compact, three jointed. Prothorax at the base more than twice as broad as long, deeply emarginate in front, finely and irregularly punctured; anterior angles acute; the lateral margins broad, slightly reflexed, finely punctured and aciculate. Scutellum transverse, rounded behind, finely and rather closely punctured. Elytra more than one and-a-half times as long as the head and prothorax together, the sides nearly parallel for two thirds of their length then arcuately narrowed to the apex; lateral margins broad, slightly reflexed. Underside and legs pale ferruginous. Length 4½ mm.; greatest width 2¾ mm.

Albany, West Australia; Port Lincoln, South Australia.

This very distinct *Ancyrona* may be known at once from the other species here enumerated by its having the elytra finely and irregularly punctured (not punctate-striate) and the scales on the disc arranged in rows.

26. Ancyrona vesca, sp. n. (A.M.)

Ovate, moderately depressed, dark ferruginous brown, somewhat shining, very finely, closely and irregularly punctured; lateral margins pale ferruginous; head and prothorax closely covered with small grey scales and very fine pubescence; each elytron with two indistinct reddish testaceous spots near the suture, one at the base the other just behind the middle, the scales forming irregular rows on the disc.

Head transverse. Antennæ pale ferruginous, the club moderately compact, three jointed. Prothorax at the base more than twice as broad as long, deeply emarginate in front; anterior angles acute; lateral margins very broad, reflexed, finely punctured and pubescent. Scutellum very small, transverse, very finely and closely punctured. Elytra about one and a half times as long as the head and prothorax together, slightly narrowed behind, finely and closely punctured on the disc, more finely and closely punctured near the sides; lateral margins broad, reflexed and finely punctured. Underside and legs rather pale ferruginous. Length 2¾-3¾ mm.; greatest width 2-2½ mm.

Monaro, New South Wales; South Australia; King George's Sound, West Australia.

Allied to the preceding species but easily separated by its smaller size and more ovate form, by its more arcuately rounded prothorax and by its pale coloured lateral margins.

PELTOSCHEMA.

Reitter, Verh. ver. Brünn, XVIII., p. 4 (1880).

This genus is only known to me by the abstract of Herr Reitter's description published in the "Zoological Record," for 1880, judging from which it appears to differ from all the Australian forms in having the prothorax bilobed and the antennæ eleven jointed and filiform.

27. PELTOSCHEMA FILICORNIS.

Peltoschema filicornis, Reitter, Verh. ver. Brünn, XVIII.. p. 5 (1880).

Australia.

LOPHOCATERES.

Olliff, Trans. Ent. Soc. Lond. 1883, p. 180 and Cist. Ent. III., p. 58 (1883).

Body elongate, free from scales. Head almost truncate in front. Antennæ eleven jointed, the eighth joint somewhat broader than the preceding ones, the three terminal joints forming a gradual and moderately compact club. Elytra finely costate. Prosternum projecting behind the coxæ. Tibiæ armed on their outer margins with short sharp spines; the posterior tibiæ with a row of inconspicuous blunt teeth at the apex projecting over the first joint of the tarsus.

In Herr Reitter's revision of the Trogositidæ the *Ostoma Ivani* of Allibert was placed in *Grynocharis*, which was regarded as a division of *Ostoma*, but subsequently (Verh. ver. Brünn, XX., p. 36, 1882), it was referred by the same author to *Gaurambe* also treated as a division of *Ostoma*. In my opinion *Lophocateres* has quite as good claim to generic rank as *Ancyrona*, *Latolæva* and other groups recently separated from the old genus *Ostoma*.

28. LOPHOCATERES IVANI. (A.M.)

Ostoma Ivani, Allib. Rev. Zool., 1847, p. 12.

Peltis pusilla, Klug, Ins. Madag., p. 159.

Sydney, New South Wales; in rice and other grain.

This species although not very common is spread over the whole world. It has been recorded from South America, Madagascar, Siam and China. In Europe it is known from Spain, and I have myself captured it in a herbarium in London. At Leyden I have seen specimens in dried apples where they were found in all stages by my friend Mr. C. Ritsema.

NOTES FROM THE AUSTRALIAN MUSEUM.

A New Butterfly of the family Lycænidæ from the Blue Mountains.

By A. Sidney Olliff, F.E.S.,

Assistant Zoologist, Australian Museum.

The very distinct species described below was taken by myself during the second week in September, at Katoomba, on the Blue Mountains, at an elevation of 3,350 feet above the sea level. Among other butterflies found at the same time, I may mentoin *Xenica hobartia*, Westw., as, I believe, it has not previously been recorded from New South Wales. Mr. Meyrick has taken this species at Fernshaw, Victoria, in December.

Chrysophanus cyprotus, sp. n.

♂ Dull coppery fulvous, with purple reflections ; the apical third of the costa and the hind-margins narrowly bordered with dark fuscous. Forewing with a broad bright purple median fascia-like spot, extending from vein 1-7, narrowed at both extremities, the posterior margin produced into acute teeth along the veins ; both wings purple at the base, hindwing more broadly. Underside ashy grey. Forewing with a very small black double dot at the end of the discoidal cell, and two transverse series of five or six crescentic dots near and parallel to the hind-margin. Hindwing with the following black dots—a series of four near the base, one near the base of the subcostal nervure, two transverse parallel series, one just behind the cell, the other half way between the cell and the hind-margin, a similar and less distinct series nearer the hind-margin. Cilia grey, with obscure blackish dots on the veins. Exp. 36 mm.

♀ Bright purple. Forewing with the costa from base rather widely bordered with dark fuscous, towards apex very broadly, coalescing with a moderately broad hind-marginal border. Hindwing narrowly bordered with dark fuscous, on the costa much more broadly. Underside as in male. Exp. 38 mm.

Katoomba, New South Wales (3,350 feet).

I consider the genus *Chrysophanus* to be defined as distinct from *Lycæna* by the possession of naked eyes, consequently *erinus*, Fabr. and *heathi*, Cox, (1) hitherto placed in *Lycæna*, are correctly referable to *Chrysophanus*, and are, in fact, nearly allied to the present species ; the spinose tarsi and anterior tibiæ probably afford a good secondary character.

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(1) Entom. VI, p. 402 (1873).

A REMARKABLE FISH FROM LORD HOWE ISLAND.

PLATE XLVII.

BY WILLIAM MACLEAY, F.L.S, &c.

Mr. H. T. Wilkinson, Visiting Magistrate of Lord Howe Island, brought with him from that place, a few weeks ago, a Fish which had been picked up dead on the beach there. It was handed to me for identification, or, if new, for description, by his brother Mr. C. S. Wilkinson, Government Geologist.

I cannot find a record anywhere of the existence of any such fish, and indeed so curious is it in many particulars, that I cannot even venture to point out its affinities. I have given it the generic name of *Ctenodax*, from a fancied resemblance to the teeth of the Odacina, but it cannot be placed in that group, nor indeed in any group of the *Labridæ*, and I am not at all sure that it belongs even to the order *Acanthopterygii pharyngognathi*. In the meantime, imperfect though my diagnosis is, I give a drawing and description of it, so that others may have the opportunity of forming an opinion of what is undoubtedly a very extraordinary Fish.

Genus. CTENODAX.

Of elongate subcylindrical form. Scales small, firm, rigid, ctenoid, keeled, and spinous. Dorsal fin long, the spinous portion low, the spines only connected by a membrane at the base. Head rounded at the muzzle. Teeth in a single row. Lower jaw pointed and deeply emarginate at the symphysis. A bony ridge on the vomer. The tongue pointed and cup-shaped. Mouth oblique. Eye large. Lateral line continuous and nearly straight. Ventral fins $\frac{1}{5}$, short and close together. Caudal fin small and forked, two strong converging keels on the tail. Gills, 4. Branchiostegals, 3.

CTENODAX WILKINSONI.

D. 14/10. A. 1/10. L. lat. 90. L. tr. 7/14.

The height of the body at the ventral fins is one-seventh of the total length; the length of the head is nearly one-fourth of the same. The form is elongate, very slightly compressed and tapering towards the tail. The scales are closely adherent to the skin and to one another, so that it is extremely difficult to separate one for examination, but the drawing by Dr. von Lendenfeld (fig. 5), gives a good idea of the general character of them. Each scale has about eleven longitudinal ridges with 5 or 6 recumbent spines on each ridge; laterally the scales overlap one another as shown in fig. 6, but the free posterior edge of each only very slightly overlaps the one behind it. The scales in the aggregate as shown in fig. 4, assume an appearance of being square, with a multiplicity of parallel longitudinal lines crossed at right angles by similar transverse lines. The spinous dorsal fin, which commences over the middle of the ventrals is composed of short, strong, isolated spines, connected at the base only by a membrane; the soft dorsal which is continuous with it, is shorter and higher, and densely scaly. The anal fin is like the soft dorsal, but is placed a little nearer the tail, the spine is minute. The caudal fin is small and forked; two very strong keels or ridges on the tail converge towards the middle of the fork of the fin.

The pectoral fins are rather small, about twice the length of the ventrals, which are placed close together. The eye is large, lateral, much nearer to the upper than under surface of the head, and slightly nearer the snout than the extremity of the operculum. That and the preoperculum are unarmed and densely covered with scales. The snout is rounded and without scales. The mouth is oblique; the maxillary extending to beneath the anterior margin of the orbit.

The teeth are in a single row, long, slender, and so packed together as to resemble the solid teeth of the *Scaridæ*, excepting at their apices which are free and minutely pointed. Fig. 2 shows distinctly the teeth of the lower jaw. In the upper jaw there are at the symphysis some round, smooth, nodular-like protuberances extending some distance back on the vomer. The color is uniform sooty black. Length, 7 inches.

I have been compelled, in the foregoing description, to confine myself entirely to external characters; a complete and satisfactory investigation could not be made without injury to the specimen.

EXPLANATION OF PLATE XLVII.

Fig. 1.—Ctenodax Wilkinsoni. Nat. size.

Fig. 2.—Side view of mouth magnified.

Fig. 3.—Front view of ditto ditto.

Fig. 4.—Some scales of side slightly magnified.

Fig. 5.—Single scale magnified.

Fig. 6.—Three scales of transverse row in natural position magnified.

RECENT CHANGES IN THE FOREST-FLORA OF THE INTERIOR OF NEW SOUTH WALES.

By R. v. Lendenfeld, Ph.D.

At my request Mr. Ridston, Forest Ranger of Condoblin, compiled his experience on the above subject, and wrote a report thereon to the Department of Mines. The Under-Secretary has kindly allowed parts of it, which I consider to be of general scientific interest, to be read before this Society. These, together with other observations, are used to explain certain interesting changes in the forest flora of the interior.

In 1863 there was little or no pine scrub (Callitris) in the Lachlan district. In 1883 the pine had taken possession of the district and was rapidly superseding the Angiosperm trees, which previously formed the forest in that district. It appeared to be only a question of time, when the forest would be converted into a pine forest. In 1885, when engaged in collecting timber specimens, Mr. Ridston could not obtain a single sound tree of any size with the exception of the pine. I myself visited the Mooramba district at the beginning of 1885 and found there a prevalence of pine which was, according to the statements of old residents, a new acquisition in that district.

The pine seemed to grow equally well in damp hollows and on dry hills.

It appears, however, that the pine has now reached its maximum development in that district, as patches of it are completely dying out in consequence of the ravages of a beetle, Diadoxus erythrurus or rather its larva. According to the statements of old residents, this beetle and its effects on the pine have never before been observed, and it would therefore appear that there is a certain correlation between the beetle and the pine. There can be little doubt that the spread of this beetle is dependent to some extent on the prevailing climate.

The mean rainfall in Sydney from 1840-1863 was about 48 inches, whilst that of the period from 1863-1880 was about 55 inches. The mean rainfall for the period 1880-1884 was only about 40 inches.

As sufficient observations have not been made in the interior, we can only consider the Sydney results; and although it is doubtful whether there is much similarity in the rainfall of Sydney and the Interior, still it appears likely that a series of dry years in Sydney indicates an isochrone drought in the interior.

If we compare the observations mentioned above we shall arrive at the following result:—

1840-1863.	Average rainfall 48 inches. (Sydney.)	No Pine Scrub. Beetle ?
1863-1880.	Average rainfall 55 inches. (Sydney.)	Pine Scrub spreading. No Beetle.
1880-1884.	Average rainfall 40 inches. (Sydney.)	Pine Scrub disappearing. Beetle prevalent.

It seems from this, that the drought is favourable to the spread of the Diodoxus erythrurus and that this beetle then destroys the pine, whilst the wet years prevent the development of this species, which seems to attack the pine only, and enables the pine scrub again to spread.

This little contribution to the influence of climate on the flora and fauna may perhaps hereafter be of use to scientists investigating this most important subject.

THE AUSTRALIAN FRESHWATER RHIZOPODA.

By R. v. Lendenfeld, Ph.D.

Part I.

It is intended to enumerate the Australian species and describe such as may be new, in this paper.

1. Amoeba villosa. Wallich.

I have seen a great number of Amoebæ recently from various parts of the Botany Swamps, and they all seem to be very similar to the species described as A. villosa, by Wallich. These Australian specimens are very large and creep about very rapidly between the roots of Sphagnum. The posterior end—that is the one behind in motion—generally possesses the short villi-like pseudopodia characteristic of the above species. These, however, appear not to be present invariably; often ordinary lobate pseudopodia are seen on all sides.

The outer layer of protoplasm is hyaline; in the interior there are small and highly refractive granules in great abundance, and others of larger size and spherical in shape. These are very numerous in the large specimen, but the younger ones appear more transparent.

The nucleus is large and spherical; being, however, very soft, its shape is liable to great variations as the animal moves along. The whole inner portion is occupied by a transparent vacuole which is enclosed in a very clear reticulation. The chromatin threads of the superficial reticulation do not extend to the interior of the nucleus, which is occupied by achromatin only.

Osmic acid specimens and also acetic acid specimens show this particularly well.

2. Arcella vulgaris. Ehrenberg.

This species occurs in all freshwater lagoons and creeks suitable. It appears that the Australian forms are more rounded at the margin and do not possess so sharp a margin as it is figured for instance by Bütschli in Bronn's Classen und Ordnungen des Thierreichs, Band I., Tafel II., fig. 9a.

3. Lieberkuehnia australis. Nova Species

This species differs from the species described by Cienkovsky, Lieberkuehnia paludosa, particularly by its being very much more slender—nearly 6 times as long as broad.

The nucleus is spherical, the pseudepodia straight and unbranched. The hyaline shell is conical and abruptly cut off at the narrow end. The aperture is situated at the broader end of the conic shell.

Not very frequent at Botany Swamps.

4. Echinopyxis australis. Nova species.

This species appears like an Arcella with spines. There is no hexagonal reticulate sculpture on the shell, which is brownish-grey in color.

The spines are situated in a circle on the margin of the flattened shell, in length about ⅓ of the diameter of the shell, from 7-10 in number, and obtusely pointed.

The last part resembles Arcella vulgaris in every respect.

Botany Swamps, not very frequent.

5. Lecquereusia spiralis. Lecq.

This species has been found in the Botany Swamps, attached to Sphagnum, in November by me.

6. Difflugia pyriformis. Perty.

This species is frequent in Botany Swamps.

It is very remarkable that of these 6 species only two seem to be specifically Australian, and even these may be identical with species from elsewhere.

No peculiar or remarkable form of freshwater Rhizopod has been found in Australia.

Of course it is not possible to say whether the species enumerated are indigenous or not.

We could easily imagine that some specimens of one or the other might have been brought in the freshwater in ships or in other ways. We can, however, not assume that there were no freshwater Rhizopoda in Australia before the advent of Europeans, and so it seems that some of these species are indigenous.

It is impossible that they should travel through the wide expanse of salt water which divides Australia from the other Continents.

We cannot suppose that they can have developed independently of each other, because they are so very similar in detail, and must therefore assume that they are animals of very great geological age, and that they have remained unchanged all the time, since the landbridge between Australia and any other Continent disappeared.

The fact that no Rhizopods peculiar to Australia have been found, seems to indicate that no recent spontaneous generation has occurred.

AN ALGA, FORMING A PSEUDOMORPH OF A SILICIOUS SPONGE.

R. v. LENDENFELD, PH.D.

(PLATE XLVIII., FIG. 5.)

(FROM THE AUSTRALIAN MUSEUM LABORATORY.)

The sponge in question is a new species of Dactylochalina, and I will give a short description of it here, before entering on the subject proper of this paper.

DACTYLOCHALINA AUSTRALIS. Nova species.

The outer appearance of the sponge is very similar to that of Dactylochalina reticulata, R. v. Lendenfeld, described in a previous paper in this number of the Proceedings.

The whole sponge in Dactylochalina australis, is formed of cylindrical elongate parts, 8-10 mm. in diameter, with a circular transverse section and numerous large oscula. These are circular, and have an average diameter of 3 mm. The surface of these digitate structures is not smooth and regular as in other species, but appears rather rough and irregular in consequence of the presence of irregular protuberances and numerous sharp curves. The oscula are slightly raised. The length of these digitate processes is 150-250 mm.

A number, 6-20, of such cylindrical digitates grow out from a common base. They never form anastomoses.

The skeleton consists of a network of fine horny fibres, in the axis of which spicules ac^3 are contained. These are larger than in most other species; they are pretty numerous, straight, and decidedly spindle-shaped, gradually pointed.

Dactylochalina australis has been found in Port Jackson (Ramsay, v. Lendenfeld), Port Phillip (v. Lendenfeld), and Western Australia (Baily). Among the numerous specimens of Dactylochalina australis nova species examined by me, there were three which, although similar in shape, could be distinguished from the others by their greater rigidity. These came from Western Australia. On microscopic investigation, it was found that these specimens (dry) were not sponges at all, but Algæ. The whole structure is mainly formed of continually ramifying cylindrical branches, which form occasional anastomoses, and terminate on the surface of the digitate sponge with rounded ends. This structure is of a very uniform nature throughout. The thickest stems and branches are found in the interior; they measure 0·15 mm. in diameter. The final ramifications have a thickness of 0·08 mm.

The meshes of the network formed by these threads, are about 0·5 mm. wide, and somewhat similar to the interstices between the horny fibres in species of Dendrilla, but totally different from the shape of the meshes in the Chalinid sponges.

The threads themselves are formed of the ordinary vegetable cells, which are remarkable for their extremely thick wall.

On burning portions of the specimens, and examining the ash, the *same spicules are found in great numbers*, which are present in Dactylochalina australis the sponge, whose shape this Alga so closely resembles.

In every detail the shape of the sponge is copied; the protuberances on the surface, and the oscula are there, but not a trace of the *horny* skeleton of the sponge can be detected.

In the specimens examined no spores were found, so that I am not able to identify the Alga. It seems to be one of the Florideæ. There can be no doubt—this is proved by the presence of the silicious spicules—that these structures are Pseudomorphs of the Dactylochalina australis. I assume, that the Alga is a parasitic species growing in the sponge, and extending throughout the whole body of it. The sponge is thereby resorbed by the Alga. The soft parts and horny fibres disappear, whilst the silicious spicules are left, and appear, on close examination, adhering to the outer side of the stem and branches of the Alga. In this way this Alga forms a true Pseudomorph of the sponge.

I do not think it in any way comparable with other more simple Alga-parasites found in sponges, which cause the formation of the filaments in the Thicinidæ, and others.

EXPLANATION OF THE FIGURE.

(Plate XLVIII., Fig. 5.)

Section through a portion of the Pseudomorph magnified.

DESCRIPTION OF A NEW SPECIES OF ONCHIDIUM.

BY JOHN BRAZIER, C.M.Z.S.

ONCHIDIUM CHAMELEON. Nov. sp.

Animal large, variable in colour, from dark brown to yellowish brown and blackish brown. Back regularly rounded, granulose or papillose all over. No eyes to be seen in the papilla with either the lens or microscope; marked with two longitudinal yellowish lines, rather broad, one on each side of the dorsal surface and nearly extending to the posterior end where they meet in the form of the letter V., tough and coriaceous. Eyes globular blue black, on rather short ringed constricted tentacles. Muzzle thick and strong, somewhat crescentic shaped and corrugated, slightly divided in the middle. Foot rough, of a dirty yellowish brown colour, the forepart rounded, the hinder part narrow and pointed, the under surface of the mantle edge tinged with light yellow and blue black. Spirit specimens show it of a blue-black only.

Long, 61; breadth at head, 15; in middle, 17; at tail, 14 millimeters, when crawling.

Long, 38; breadth at head, 23; in middle, 21; at tail, 15 millimeters, when dormant.

Long, 23; breadth at head, 8; in middle, 11; at tail, 9 millimeters, spirit specimens.

Hab: Lane Cove River, Port Jackson, N. S. Wales.

PRELIMINARY REPORT ON THE HISTOLOGICAL STRUCTURE OF THE DORSAL PAPILLÆ OF CERTAIN SPECIES OF ONCHIDIUM.

BY R. VON LENDENFELD, PH.D.

(From the Australian Museum Laboratory.)

The structure of the tubercles was studyed by means of section series, through specimens of Onchidium chameleon, Brazier, described above, and Onchidium Dämelii, Semper. The specimens were collected by Mr. Whitelegge in Port Jackson, hardened with osmic acid and stained in various ways.

The results of this investigation are the following :—

1. Onchidium chameleon has small papillæ and has no eyes, O. Damelii has generally three large eyes on each papilla, these are situated laterally.

2. My investigations carried on with excellent material, corroborate the descriptions given by Semper (1) of the eyes of Onchidia perfectly.

3. The eyes of Onchidium Dämelii belong to Semper's group I., eyes with an epithelial retina.

4. The epithelium of the tubercles is of identical structure in the species with, and the species without, dorsal eyes, and formed

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(1) *C. Semper.* Ueber Sehorgane von dem Typus der Wirbelthieraugen auf dem Rücken von Schnecken—Reisen im Archipel der Philippinen Zweiter Theil.

of an outer layer of low cylinder cells, between which there are slender sensitive cells, particularly abundant round the eyes or on the sides of the tubercles (blind species.)

5. The otolith-like concretions in the numerous vesicles of the dorsal skin are composed of carbonate of lime and homologous to parts of the shell of other related pulmonates.

6. The eyes multiply by division, semi-detached eyes, and such with a simple spherical pigment layer, but with two lenses are not rare.

7. The lens consists apparently of one single cell which retains its nucleus and vitality, and may divide into two. A sphincter-shaped circular accommodation muscle is clearly visible.

8. The retina is of a much more complicated nature than Semper, who only had spirit specimens at his disposal, was able to discover. The radiating fibres of the nervus opticus are interspersed with small ganglia cells. Below these follow cells with peculiar plano-concave bodies in them, which are highly refractive. These cells are broad and cylindrical. The final branches of the Opticus extend downward between them to a layer of multipolar cells below. Below this layer of granular (osmic acid) ganglia cells, cylindrical and very regular hexagonal cells are found; the axis of each is situated in the direction of the entering light. These hexagonal cells are attached to the pigment-skin at the outer limit of the retina. Pigment granules extend up the sides of the partition walls of these hexagonal cells for some distance. The walls themselves are thickened below, and in this way concave spaces are formed, one at the bottom of each hexagonal cell. These spaces are completely surrounded by pigment.

In the centre of each, a rod (Stäbchen) is situated. This has a conical shape, is attached with a broad base to the bottom of the concave space, and tapers rapidly at first and more gradually afterwards, to a fine point. Its faces appear concave. The upper pointed end of the rod is continued in the shape of a very fine thread extending through the centre of the hexagonal cell and joining the ganglia cell-layer.

9. Nothing is to be added to Semper's statements regarding the nervi optici.

10. It is remarkable that the Onchidium Dämelii never retracts her tubercles or feelers, however near the forceps or scissors approach them until they are actually in contact. This might lead one to assume that this animal is farsighted.

11. The concave lenses on the upper ends of the facets, below the large spherical main lens, appear as a secondary arrangement produced for the purpose of counteracting the bad effect of an oval or spherical lens in air.

The lens was originally, probably, adapted for seeing in water, and therefore had such a great curvature and short focus. When the Onchidium took to living on land this lens was too strong—for use in air—and then the little concave cells might have been produced to counteract the excessive power of the main lens.

OBSERVATIONS ON SOME AUSTRALIAN *POLYCHÆTA.*

By William A. Haswell, M.A., B.Sc.,

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Part I.

[With Plates L.—LV.]

I. SYLLIDÆ.

Kinberg (1) has described two species of this family (*Thoë fusiformis* and *Eurymedusa picta*) obtained in Port Jackson during the voyage of the "Eugènie." These are, as far as I am aware, the only species of *Syllidæ* that have been described from the Australian coast. I have not been able to obtain access to the more detailed descriptions of these Annelids given in the "Annulata" of the "Eugenies Resa," (the two copies of that work which I have had the opportunity of examining being both incomplete), but by a careful analysis of the short definitions in the preliminary paper above referred to I have convinced myself that the species in question are both distinct from any of the six described in the present memoir.

Of these six species one (*Syllis corruscans)*, is very remarkable in several respects, and most especially in the presence in the section of its alimentary canal which I here call the gizzard, of striated muscular tissue of a very marked type—a tissue which has never before been described as occurring in the Annelida.

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(1) "Annulata nova." Ofvers. of K. Vet-Akad. Förh, 1864.

SYLLIS CORRUSCANS. N. sp.

(Plate L., figs. 1—3; and LV., fig. 5.)

The colour of this large species is rich greenish-brown on the dorsal surface (after preservation in alcohol, sage green); red on the parapodia and the cirri, and reddish green on the under surface. There are two broad bands of emerald green on the first three segments, running obliquely backwards and outwards and narrowing posteriorly. The head and palpi are bright crimson.

The length is usually about 3½ inches, the greatest breadth ¼ of an inch. There are 150 to 200 segments; on an average the segments are about four times as broad as long. In the anterior portion of the body the breadth of the segments is about seven times the length; towards the middle of the length of the body it is about five times, the breadth of the body decreasing and the length of the segments increasing at the same time. Each of the segments of the middle and posterior regions of the body is marked on the dorsal surface with several impressed transverse lines.

The head is short, twice as broad as long; the palpi are broad and somewhat dorso-ventrally compressed; they are continuous with one another for a short distance at the base, rather longer than the head, and are habitually directed downwards; the præstomial tentacles are subequal, the mesial very slightly longer than the lateral, a little longer than the palpi, obscurely ringed. The anterior pair of eyes are pyriform, with the apex directed inwards and slightly backwards. The hinder pair are rounded, situated behind and internal to the first, close to the posterior border of the head. There are two subequal peristomial tentacles which are much shorter than those of the præstomium, and, like them, indistinctly ringed. The dorsal cirri are longer than the tentacles, usually about equal in length to the breadth of the body (some being a little longer, some a little shorter), not very distinctly ringed. The number of joints varies from ten to twenty; in some instances a considerable extent of the cirrus exhibits no joints. The parapodia are well developed, bilobed, the ventral lobe the broader, with about fifteen compound setæ, the dorsal lobe with six to eight stout, simple acicula. The ventral cirri are leaf-like and short, scarcely reaching as far as the extremity of the parapodia. The compound setæ are not distinguishable from those of *S. Schmardiana* described below. The anal cirri are rather stouter than the dorsal cirri immediately preceding them, as long as the last seven or eight segments, tipped with a small brown mark.

There is a single triangular tooth. The œsophagus in the retracted condition extends to the twelfth segment, the gizzard to the sixteenth.

This beautiful annelid is not uncommon in the littoral zone in Port Jackson, and is brought up very frequently in the dredge from various depths (up to 15 fathoms).

There are a good many points of resemblance between this species and *Syllis solida*, Grube, from the Phillipines: but in the latter species the palpi are relatively short, while the dorsal cirri are relatively long, and the transverse lines on the dorsal surface are apparently absent.

Characteristic of the hypoderm in this species (Plate LV., fig. 5) is the presence of innumerable multitudes of unicellular glands of flask-like form, with more or less prolonged necks, which pierce the cuticle to open by a minute pore on the exterior. Most of these glands are full of granular matter, which becomes intensely stained with hæmatoxylin; some of them, however, are occupied by an open reticulum. The ordinary hypoderm cells are arranged in an outer layer of vertically-elongated cells, the outer ends of which are broad, while the inner ends are drawn out into fine threads, and an inner layer of fibre-like cells which form a network of fine threads with nuclei and pigment granules.

The longitudinal muscular fibres of the body-wall form an almost continuous layer, interrupted only along the bases of the parapodia and along the line of the ventral nerve cord.

There is a circlet of about twenty compressed papillæ in the œsophagus. The tooth is hyaline, triangular, acutely pointed. The part of the lining membrane external to the papillæ is light red in the living state, that of the part following light pink. The cuticle of the œsophagus is extremely thick and hard, the epithelium composed of very narrow, fibre-like cells. The structure of the following division of the alimentary canal will be fully described by me elsewhere (1). It has usually been regarded as a glandular organ (Drüsenmagen, proventricule, stomach), but is really much more properly called a gizzard. It has a comparatively thin cuticle, like that of the outer surface, and an epithelium consisting of non-ciliated columnar cells, with conical and spindle-like "cellules de remplacement" at the base. The remainder of the thick wall of the organ is composed of muscular tissue—an external and an internal layer of the ordinary non-striated fibres arranged circularly and longitudinally, and a middle layer, which is by far the thickest, composed of striated fibres arranged in a radiating manner. There is, in addition, a set of non-striped fibres, which do not form a complete layer, but are disposed as a series of rings between the outer ends of the striated fibres. The wall of the organ presents on either side a raphe, where the striated fibres are absent and the layers of non-striated fibres blend. The striated fibres present a nucleated protoplasmic core, and the striations in their substance are of a very marked character. What are ordinarily described as the transverse rows of glands, are these rows of columns of striated muscle. They have been described and figured as glands by many observers, Claparède (2), Langerhans (3), and Ehlers (4) among the number; their muscular character, was observed by Eisig. (5), who, however, overlooked the striations.

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(1) I have previously given the present species the temporary designation of *Syllis a*.

(2) "Annélides Chétopodes du Golfe de Naples."

(3) "Zur Wurmfauna von Madeira" and "Canarische Anneliden."

(4) "Die Borstenwürmer."

(5) "Ueber das Vorkommen eines Schwimmblasenähnlichen Organ bei Anneliden." Mittheil. aus der Zool. Stat. zu Neapel. II. Band.

There are two cæca in the succeeding part of the alimentary canal, each of which becomes branched, the branches themselves showing a tendency to divide. The epithelium differs from that of the gizzard in its much greater thickness, being composed of several layers of cells, of which the superficial layer is ciliated; the epithelium of the cæca is looser and more irregular, and the cilia appear to be absent.

The only other noteworthy point in the structure of the alimentary canal is the presence in the epithelium of the hinder portion of the intestine of multitudes of greenish concretions similar to those noticed by Claparède, in *Syllis gracilis.* Precisely similar bodies occur, often in large quantities, in the epithelium of the dorsal portion of the cæca of *Polynoë* and *Aphrodita*, and they occur also abundantly in the narrow glands of *Chlorœma* and the so-called tubiparous glands of *Serpula* and *Sabella.* It is not unlikely that these concretions are in all these cases of a uric character, and that the organ in which they occur acts as the nephridium of the annelid. (1)

The nerve-fibres of the ventral cord are arranged in three distinct bundles, one smaller mesial, and two larger lateral. The large ganglion-cells are grouped on the dorsal aspect of the ganglia. Towards the middle line of the dorsal aspect of the cerebral ganglia, is a group of very large ganglion-cells arranged in converging lines enclosed in fibrous tissue, each group connected with the fibrous matter of the ganglia by bands of fibres. External to this, and nearly surrounding the whole of the fibrous matter of the ganglia, is a layer of very small cells which form specially large groups in the neighbourhood of the eyes.

The eye has a homogeneous crystalline lens, apparently formed of a thickening of the cuticle, a retina composed of short rod-like elements which do not stain readily with hæmatoxylin, and a layer of columnar cells, which, thickly pigmented internally, are continuous externally with fibres passing into the substance of the cerebral ganglia.

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(1) It is necessary to draw a clear line of distinction between the terms "segmental organ" and "nephridium." Thus the nephridia of *Polynoë* are not the segmental organs, as Mr. A. G. Bourne maintains, but probably the dorsal division of the intestinal cæca, the segmental organs being generative ducts.

The segmental organs are curved brown tubes opening on the ventral surface close to the parapodia. The function discharged by these organs in *Syllis* seems not to have been positively ascertained. No doubt they act as generative ducts, but neither Mecznikow, Ehlers, nor Claparède, who have all noticed or described the organs, mentions having observed them giving passage to ova or spermatozoa.

This species increases like many of the *Syllidæ,* by a combination of budding and fission ; and exhibits some remarkable peculiarities in connection with the processes of reproduction. In specimens obtained from between tide-marks in Port Jackson, about the month of August, I found none in the act of proliferation ; nearly all, however, showed a marked division of the body into two regions—a long dark-coloured female region, in which the body cavities of most of the segments contained ova, and a much shorter, posterior orange-coloured male region, in which the sexual glands were imperfectly developed testes. The passage from the one region to the other takes place somewhat abruptly about the 100th segment, the body at this point becoming narrower, and both the parapodia and the dorsal cirri smaller. In specimens taken at the same time in deeper water, the posterior orange-coloured region was found to be considerably longer ; in most it had developed on its first segment two pairs of large eyes, and frequently was found altogether detached from the female. The following is a description of the curious male form thus produced by budding from the posterior end of the female :—

The colour is reddish orange, finely mottled with dark brown along the middle of the dorsal surface. The length is an inch, the breadth a fifth of an inch. There are forty-five segments, but some of the posterior segments appear to be wanting in the specimens I have examined. The head is very broad, broader than the body-segments, and very short; its anterior border is concave. In the middle of this concavity, on the ventral aspect, is a short ciliated process, and on either side of this, just below and in front of the eye, is a broad lobe, which seems to represent a rudimentary palp. At the antero-external angle of the head is a short, horn-like tentacle. The eyes are just behind these tentacles, placed close to the lateral border of the head; their breadth is about a fifth of that of the head.

The first pair of parapodia are very well developed, and are nearly a fourth of the breadth of the head; they are furnished with about twenty setæ, all of which, except two or three on the dorsal aspect, are compound. Like the following segments, the first has a very long, ringed dorsal cirrus, which is very much longer than the breadth of the body. In the following segments the parapodia are very large and provided with two bundles of setæ, those of the dorsal fasciculus numerous, simple, very slender, and longer than the breadth of the segments; those of the ventral fasciculus compound.

The cavity of the body is full of bright red spermatozoa. The alimentary canal presents no trace of its ordinary divisions, having the form of a simple tube.

SYLLIS KINBERGIANA. N. sp.

(Plate LI., Figs. 1-3.)

The colour of this species is light yellow, with greenish transverse lines. On each segment is a pair of very light yellow or greenish-white dots, which are most distinct in the middle and posterior regions of the body. There is a patch of white on the dorsal surface just behind the head. The head is light red, the eyes crimson. The ordinary length is $2\frac{1}{2}$ inches; the breath $\frac{1}{20}$th of an inch. The head is short, its breadth greater than its length, bilobed, the two halves rounded on the dorsal aspect. The palpi are triangular, rather pointed, twice the length of the head, separated from one another by a narrow interval. The median tentacle is twice the length of the palpi, a little longer than the lateral tentacles. The dorsal cirri are usually slightly longer than the breadth of the segment. Their joints are very indistinct and the number very irregular; usually there are about a dozen joints in each cirrus, but the number varies with the length of the appendage. The segments of the body are, as as a general rule, about 2½ times as broad as long; their lateral borders are strongly convex. Each of them is crossed on the dorsal surface, about its middle, by a narrow transverse impressed line, due to the presence in that position of a narrow transverse band of muscle. The parapodia are not prominent; they are bilobed, the lobes pointed; there is a stout ventral cirrus which is a little larger than the parapodium proper, with 15 to 25 compound setæ. On the dorsal side of those are three shorter acicula.

The œsophagus is surrounded by a circlet of papillæ and armed with a single triangular, hyaline tooth. When retracted the papillæ are opposite the third segment; the œsophagus, which is short, extends from the fourth to the eighth segments; the gizzard, which is also short, from the eighth to the eleventh.

There are two short cæca. The epithelium of the intestine is full of small, solid greenish granules.

The hypoderm is full of oval unicellular glands, sometimes quite clear, sometimes full of granules. All the specimens seen were males.

This species is not uncommon among mussels and ascidians on the shores of Port Jackson.

When compared with Grube's description of *S. umbricolor* one is struck by certain points of resemblance. Thus Grube describes his specimen as marked on the dorsal surface with grey transverse lines, and behind with impressed points, which might perhaps be the expression in spirit specimens of the markings described above; but the apparent absence of acicula and the smaller numbers of the setæ in the *S. umbricolor* seem to distinguish that species from the present one.

The present species is also nearly related to two European species—*S. gracilis* and *S. hamata*; but differs from both of them in the form of the setæ and the greater shortness of the gizzard; from the former also, apparently in the greater length of the cirri. It is likewise allied to *S. simillima* of Claparède. From *S.*

bacillipara it differs, among other points, in the form of the unicellular glands (bacilliparous glands) of the hypoderm. Another near relative is *S. hyalina*, Grube (*S. macrocola*, Marenzeller) which, however, wants the very characteristic colouration and markings.

There is also some resemblance to *S. hexagonifera* of Claparède ("Glanures," p. 73, pl. V., fig. 2), but, besides the differences in the markings, the present species has the palpi much shorter and stouter as well as more divergent, the cirri relatively thicker, the eyes larger and closer together, and the head broader in proportion to its length.

SYLLIS TÆNIÆFORMIS. N. sp.

Plate L., figs. 4 and 5.

The body of this species is long and flattened into the form of a ribbon; there are extremely long filiform cirri. The colour is light red, with numerous narrow transverse brown bands, and there are narrow bands of the same colour between the joints of the cirri and tentacles. The head is as long as broad, bilobed behind, with a nearly straight anterior border, and with the antero-lateral angles rather prominent. There are four large eyes; the anterior pair are circular, and placed close to the antero-lateral angles of the head; the posterior pair are reniform in outline, slightly larger than the anterior pair, and placed quite close to them and almost directly behind them, but very slightly on their inner side. The palpi are thick, as long as the head, strongly bent outwards in their ordinary position. The præstomial tentacles are long and very distinctly jointed; the middle one is four times the length of the head, the lateral one nearly equal to it. The peristomial tentacles and the dorsal cirri are similar, much longer than the breadth of the body, strongly ringed. There are two rather short, jointed anal cirri. The feet are uniramous, with three acicula, and about a dozen compound setæ; the latter have a short blade bifid at the apex. There is a short conical ventral cirrus about equal in length to the parapodia.

This very beautiful species is met with occasionally in trawling at depths of a few fathoms in Port Jackson. It is extremely fragile, and it is difficult to preserve specimens intact for examination. Though in general appearance unlike most species of *Syllis*, it presents, nevertheless, all the characters of that genus.

SYLLIS SCHMARDIANA. N. sp.

Plate LI., figs. 4-8.

The colour of this small species is light reddish yellow; the eyes reddish brown. The dorsal surface is mottled with reddish brown, leaving on each segment three light spots, of which the outer pair sometimes have a dark dot in their centre. The length is $\frac{3}{4}$ths of an inch; the breadth $\frac{1}{30}$th of an inch. There are 75 segments. The body is broadest about the middle of its length, tapering towards each end. The proportion of the breadth of the segments to the length is on an average nearly as 4 to 1.

The head is prominent, rounded, a little broader than long; its dorsal surface has two rounded elevations on which the eyes are situated. The palpi are longer than the head, widely separated except close to the base. The anterior pair of eyes are very slightly larger than the posterior, rounded, situated nearer to the base of the lateral tentacles than to the posterior border of the head; the posterior pair are oval, with the long axis oblique, situated behind and internal to the larger pair. The median tentacle is about three times as long as the head, and consists of twenty-seven joints. It is inserted by a constricted base rather behind the posterior pair of eyes and close to the posterior border of the head. The lateral tentacles are very slightly shorter than the median and have twenty-five joints. They are attached immediately in front of the anterior pair of eyes. There are two pairs of peristomial tentacles—that situated nearest the dorsal side the longest, longer than the middle præstominal tentacle.

The parapodia are short, but divided into a neuropodial and a notopodial portion. The latter contains five or six stout, simple acicula, one or more of which may be obscurely bidentate at the apex. The neuropodium contains ten to fifteen compound setæ similar to those of *S. nigropunctata* (vide *infra*), but more slender and with the terminal part much narrower in proportion, and three to five acicula. The ventral cirri are short and unjointed, scarcely projecting beyond the ends of the parapodia.

The dorsal cirri are very long, six times the length of the parapodia; as long as, or a little longer than, the breadth of the body, with about 35 to 40 very distinct and regular joints.

The œsophagus is long, extending back as far as the fifteenth segment. There is a circlet of about thirty papillæ and a conical yellow tooth. The gizzard is long and narrow, extending over eight segments. The glandular part of the alimentary canal is short, extending through two segments, and has two pairs of cæca, the anterior pair the larger and slightly branched.

This species is to be distinguished from *S. erythropsis*, Grube ("Annulata Semperiana," p. 121), to which it shows some points of resemblance, by the presence of the acicula and the greater number of setæ in the parapodia. From *S. vittata* Grube (*S. aurita* Claparède, *teste* Marenzeller), it is distinguished by the form of the setæ and the absence of the transverse violet lines.

The bases of the dorsal cirri are full of rounded bodies which are readily discharged by rupture.

The wall of the gizzard presents some 40 transverse rows of radiating muscle-columns, which, on a superficial view, shew a granular interior with reddish nuclei. Each of these columns has a square outer end where it fits in with its neighbours to produce the curious mosaic-like appearance presented by the wall of this part of the alimentary tube. The centre of the outer part of each column is occupied by a little clump of very granular protoplasm containing the reddish nuclei referred to above. The transverse striations are few (only some five or six in each muscle-cylinder) but very well marked.

The epithelium of the intestine in its whole length contains large numbers of greenish concretions similar to those found in the cæca of *Polynoe*, the nephridia of *Serpula*, and the paired glands of

Chloraema. In most species of *Syllis* these bodies are found only in the posterior regions of the intestine, in which position they were noticed by Claparède, in the case of *S. gracilis.*

All the three specimens which I have seen were females full of ova. The ovaries are situated laterally near the bases of the parapodia.

SYLLIS NIGROPUNCTATA. N. sp.

Plate LII., figs. 1-3.

The length is $\frac{9}{10}$ths of an inch; the greatest breadth about $\frac{1}{20}$th of an inch. The ground colour is dull yellow; the dorsal surface of the segments is finely mottled with grey, which leaves on each segment two rounded spots of the ground colour, sometimes with a dark dot in the centre of each; at the sides of the segments are two and three black spots: towards the posterior extremity of the body these markings become much less conspicuous. The body is dorso-ventrally compressed. The number of segments is from 95 to 125. The head is rather broader than long, trilobed, the lateral lobes being very obscure, while the median one is large and rounded. The palpi are nearly twice as long as broad, rounded, widely divergent in the distal three-fourths, but closely approximated at the base. The median tentacle is about four times the length of the head, cylindrical, regularly ringed, with 22-25 joints inserted between the posterior pair of eyes, close to the posterior border of the head; the lateral tentacles are shorter than the median one, with 20 joints. The anterior pair of eyes are directed forwards upwards and outwards; they are situated a little behind the base of the lateral præstomial tentacles, and are of reniform outline; the posterior pair of eyes are situated behind and internal to the anterior pair, they are considerably smaller than the latter and are of circular form. The second segment is rather broader than the third. Its tentacles (peristomial tentacles) are two in number on each side, and much shorter than the tentacles of the head. The segments become broader from the anterior end of the body to the fifteenth segment and then very gradually become narrower towards the tail. The lateral borders of the segments are very strongly convex.

The parapodia are well developed except in the first few segments. Each has two prominent lobes. The ventral cirrus is rather shorter than the parapodia, not distinctly divided by joints; the dorsal cirrus is very long, as long as the body is broad, similar to the peristomial tentacles; moniliform at the extremities, with the joints (usually about 30 to 40) very distinct, except at the base. The dorsal cirri become very short towards the anal end of the body; the anal cirri are considerably larger than the dorsal cirri of the posterior segments of the body. The setæ, all compound, are about ten in number in each parapodium; the distal end of the shaft is very finely ciliate on one margin; the apical portion of the seta (blade) ends in two well-pronounced teeth and its border is ornamented with fine cilia. There are several stout aciculi, very slightly curved at the apex.

The œsophagus extends as far back as the seventeenth segment; it contains a single hyaline tooth and a circlet of papillæ. The gizzard extends over the following nine segments; the proventriculus over four segments; the cæca are two pairs, the anterior the larger. The intestine presents very deep inter-segmental constrictions.

The segmental organs are narrow brown tubes opening on the ventral aspect. The external orifice is a rounded opening situated at a point a little internal to the base of the ventral cirrus; from this point the tube runs inwards and backwards, then curves outwards to open by a wide aperture into the cavity of the segment. The tube is lined with somewhat irregular cells, having internal rounded ends, with the summits of which the long cilia are connected. It is very rare to find the cilia in active movement in specimens examined under the compressorium.

Found under stones between tide marks, at Neutral Bay, Port Jackson.

This species bears some likeness to *Syllis variegata*, Grube, but is much broader in proportion, has shorter tentacles and cirri, the palpi more divergent, and the head more pointed.

This species, like many of the family, increases by a process of budding and fission. About the 95th segment of the body in a male specimen, having in all 125 segments, there is a sudden slight increase of the breadth, and the first of the broader segments bears two pairs of prominent brown eyes; just behind the eyes, on the same segment, is a parapodium similar to those of the other segments.

In the hypoderm a peculiarity of this species is the arrangement of the glands. Instead of, as in *S. Kinbergiana* and *S. corruscans*, being simple, rather large, rounded or flask-shaped cells, they are very small and of irregular vermiculate shape, each opening by a minute tube piercing the cuticle.

GNATHOSYLLIS ZONATA, N. sp.

(Plate LII,, figs. 4-6.)

The single specimen which I have seen contains fifty segments, but is incomplete—a considerable part, apparently, of the posterior portion of the body having been lost. The colour is light orange, with numerous narrow transverse purple bands, two on the dorsal surface of each segment, and very narrow purple rings on the cirri; the head and palpi are bright orange.

The head is short and broad, the breadth about twice the length. The eyes in the specimen had their pigment arranged in a scattered, reticulate form, but I am not certain that this may not have been the result of *post mortem* change, as the specimen was dead when examined. The palpi are rather short, scarcely longer than the head. The median tentacle is about four times the length of the head, with well-marked joints; the lateral tentacles are very little shorter than the mesial. There are two peristomial tentacles, the one about the length of the præstomial tentacles, the other longer. The segments are very short, very many times broader than long. There are about ten compound setæ in each parapodium on the ventral aspect, and on the dorsal four yellow acicula with very slightly curved apices. The dorsal cirri are mostly as long as the breadth of the body.

The œsophagus is lined with about twelve papillæ and a pair of simple jaws. When exserted this portion of the alimentary canal extends as far back as the twelfth segment. The gizzard extends to the thirty-first segment: in structure it agrees with the gizzard of *Syllis*, but transverse striations were not observed in the radiating muscular fibres.

This species seems referable to Schmarda's genus *Gnathosyllis* ("Neue Wirbellose Thiere," I., ii., 69), but differs from the type species *(G. diplodonta)* in the form of the jaws, the much smaller size of the palpi, and many other points.

II. STAUROCEPHALUS.

STAUROCEPHALUS AUSTRALIS. N. sp.

(Plate LIII, figs. 1-5.)

The colour is light red. The body is nearly cylindrical, but a little compressed from above downwards There are nearly ninety segments, which are, on an average, eight to ten times as broad as long. The parapodia with their setæ are nearly equal in length to half the breadth of the body. The head is prominent, rounded in front; there are two pair of eyes of which the first pair are much the larger, reniform in outline, and placed far apart from one another towards the lateral borders of the head, while the hinder pair are circular in outline and situated internally to as well as behind the front pair. The superior pair of antennæ are attached just inside the larger pair of eyes, they consist of 11-13 joints and are twice the length of the head. The lower pair are slightly shorter, and have a long basal joint and a short oval distal one.

The parapodia are bilobate; the notopodium is armed with a number of fine, simple, tapering setæ, which are finely serrated along one side, and with one or two stouter setæ with a peculiar beak-like extremity; the neuropodium has about twenty compound setæ, with a slender, very slightly curved, terminal joint, obscurely notched at the apex and serrated internally. The dorsal cirri extend rather beyond the extremity of the parapodia; they are two-jointed, the terminal joint being small and pointed. The ventral cirri are very short, not extending beyond the extremity of the parapodia. There are two long anal appendages with a few indistinct joints. There are two pairs of jaws; the anterior composed of two rows of teeth, of which those of the one set are short and stout with strong denticles, while those of the other are longer and narrower with a row of setiform denticles along one side. The jaws of the posterior pair are smaller; each consists of a single curved piece.

The hypoderm is full of rounded bacilliparous glands.

This species occurs between tide-marks on the shores of Port Jackson amongst mussels. It has some resemblance to *S. Chiaji* of Claparède, (1) but differs in the greater number of joints in the superior antennæ and in the form of the "avicular" setæ. The *Staurocephalus loveni* of Kinberg, (2) which was found in Port Jackson at a depth of twelve fathoms, differs from the above-described form in having the eyes small, and the second pair of antennæ twice as long as the first.

III. EULALIA.

EULALIA (EUMIDA) QUADROCULA. N. sp.

(Plate LIII., figs. 6-9.)

The length of this species is 10½ inches; the greatest breadth, $\frac{3}{80}$ths of an inch. The colour is green, very dark on the dorsal surface, lighter underneath and on the parapodia.

The head is small, a little longer than broad, rounded in front. There is a median tentacle about half the length of the head, situated far back between the posterior pair of eyes, and two pairs of lateral tentacles about the same length as the median, placed near the front of the head; there are two pairs of eyes, the anterior pair situated near the front of the head at the base of the lateral tentacles, the posterior near the posterior border of the head, in both cases about half way between the mesial tentacle and the lateral border.

The first segment of the body bears one pair of tentacular cirri which are a little more than half the breadth of the body, stout at the base, pointed at the apex; the second segment bears two pairs

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(1) "Ann. Chét. du Golfe de Naples," p. 115.

(2) Annulata nova, p. 574.

similar in form to the preceding pair, but the dorsal a little longer and narrower; the third segment has one pair like those of the preceding segment, and a small ventral cirrus similar to those of the following segments, but no setæ.

The body contains about 270 segments, which are usually about three times as broad as long. The dorsal cirri are phylloid, a little broader towards the middle of the body than in front, the breadth about twice the length, the length not equal to half the breadth of the body, ovate, the free end gradually pointed. The parapodia are bilobed, with a phylloid ventral cirrus, armed with one stout brown aciculum, and about thirty compound setæ. The latter have a slightly expanded distal end produced into a beak-like process, with two or three short spines or teeth; and a blade which is very delicate, curved and tapering, lined on its concave border with a row of very fine short cilia.

There is an exsertile proboscis, the epithelium of which is green and is produced into pyriform papillæ.

The species was obtained with the dredge in Port Jackson.

It is related to *E. microceros* of Claparède (1), but is distinguished from it by the presence of four eyes and by the dorsal cirri of the second and third segments not being prolonged and but little longer than the ventral.

IV. PSAMATHE.

PSAMATHE ? CRINITA. N. sp.

Plate LIII., figs. 10-12.)

The length of this species is three-quarters of an inch: the breadth an eighth of an inch. The colour is dull yellow, with narrow transverse bands of dark brown on each segment.

The head is squarish, with a single, very short median tentacle, and two lateral ones, the inner of which is situated at the antero-lateral angle of the head, and is about twice the length of the latter, while the outer is placed below the inner, and is about half its length; both are slender and unjointed. There are two

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(1) Op. cit., p. 247, pl. xvi., fig. 4.

pairs of large, rounded brown eyes, placed close together at the sides of the head, the anterior very slightly larger than the posterior. There seem to be eight peristomial tentacles—three shorter than the dorsal cirri, the rest of about the same length. There are thirty-six segments in the body, each, as a rule, about three-and-a-half times as broad as long. The parapodia are very prominent, being, with the setæ, nearly as long as the breadth of the body. They are deeply divided, the neuropodium being more prominent than the notopodium, and terminating in a slender pointed process: there is a stout aciculum, finely striated transversely, in each division, and a large number of tapering compound setæ, the basal parts of which are finely striated transversely, and the distal divisions bordered with fine cilia along one margin, and slightly hooked at the apex. There is a short central cirrus not so long as the parapodia. The dorsal cirri are very long, three or four times as long as the body is broad; they are not jointed, but are supported on a short ringed peduncle.

The eversible proboscis is lined with two or three transverse rows of club-shaped papillæ. There are no teeth. The gizzard is long; its walls are marked by narrow transverse lines, and are composed of transversely and longitudinally arranged non-striated muscle-fibres.

One specimen of the species was obtained with the dredge in Port Jackson.

It would appear to be more nearly related to *Psamathe* than to any other described form; probably, however, ought to be regarded as the type of a distinct genus.

IV. SIPHONOSTOMA.

SIPHONOSTOMA AFFINE. N. sp.

(Plate LIV., figs. 1-5.)

The body is about an inch in length, and a tenth of an inch in greatest breadth: it is broadest in front, becoming narrower behind, a decrease in breadth taking place suddenly at about the twentieth segment: the total number of the segments is about forty. The colour is light red; the hinder part crimson.

The head is broader than the immediately succeeding segments. Immediately in front of the mouth on the ventral surface are inserted a pair of thick longitudinally folded palpi which are three times the length of the branchiæ.

There are two pairs of eyes; the anterior pair are large, of subtriangular outline, placed close together one on either side of the middle line of the dorsal surface of the head. The second pair which are external to, as well as behind the first, are mere specks of black pigment. The head is surrounded by a circlet of about twenty-five short cylindrical green branchiæ, and external to those at the sides and behind, by two fan-like fasciculi of very slender setæ, about forty on each side; these extend nearly as far forward as the extremities of the palpi; they are simple and hair-like, but transversely jointed. The second and all the following segments have short parapodia armed with about half-a-dozen to a dozen slender setæ similar to those surrounding the head, and arranged in two fasciculi; on the ventral aspect of the parapodium is a dark-coloured, stouter, hook-like, seta considerably shorter than the others, likewise transversely jointed. The papillæ are numerous, frequently as long as the setæ, with a long and slender hyaline stalk and a head which varies in form, but is usually long oval or spindle-like.

The anterior larger pair of eyes are complex, with a thick, darkly pigmented choroidal capsule, lined internally by a thick retina, composed of elongated radially disposed cones: they are embedded in the substance of the cerebral ganglion.

Opening just behind the head on the dorsal surface near the lateral margin, are a pair of very long narrow cylindrical glands which extend throughout a considerable portion of the body. They have delicate walls and are filled with cells with colourless walls containing in their interior rounded particles of some greenish matter.

Similar glands have been observed in *Chlorœma* and in *Stylaroides*; they are regarded by Claparède as equivalent to the segmental organs of *Terebella* and *Amphicteis*.

This species, which is obtained with the trawl in Port Jackson, is apparently nearly related to *Siphonostoma diplochaitos*, Otto (*Chloraema Edwardsii* Quatrefages), but, besides the possession of four eyes, is distinguishable by the less strongly hooked ventral setæ.

V. HALLA.

HALLA AUSTRALIS. N. sp.

(Plate LIV., figs. 6 and 7, and Plate LV. figs. 1-4.)

The colour of this species is rich orange when first taken, but, on being kept for a few hours in an aquarium, it becomes stained particularly on the branchiæ, with dark purple. When the annelid is placed in alcohol a rich purple pigment is extracted. The length is from three to four inches, and the breadth from a fifteenth to an eighth of an inch. The number of segments is great, exceeding 200. The segments, on an average, are about four times as broad as long; the parapodia are prominent, their length being about a third of the breadth of the segment.

The head is uniformly rounded, a little longer than broad, twice the length of the peristomium, but rather narrower. There are three short, stout, conical, unringed tentacles, the middle one slightly larger than the lateral, scarcely half the length of the head. There are two pairs of eyes placed near the posterior boundary of the head. The anterior pair are larger than the posterior, oval, with the long axis directed inwards and forwards, widely separated; the posterior pair are much smaller, rounded, placed close together between the anterior pair and a little behind them.

The dorsal cirri (branchiæ) of the anterior segments are stout and short, but rather longer than the parapodia; towards the middle of the body they become much larger, compressed, leaf-like, about a third of the breadth of the body. The parapodia contain a bundle of about twelve slender, flexible, tapering setæ, feathered on one side near the apex, and towards the ventral side three shorter acute acicula.

There are seven pairs of jaws, the first, the largest, without teeth; the second small, slender, acutely pointed; the third with five teeth, three large and two small; the fourth with six teeth; the fifth with seven; the sixth with six or seven; the seventh very long, narrow, untoothed.

Specimens of this remarkable annelid are brought up, not unfrequently, with the dredge from depths of a few fathoms in Port Jackson. The genus has hitherto only contained one described species—the *Nereis parthenopeia* of Delle Chiaje (1), afterwards described under the name of *Halla* by Costa. Judging from Claparède's figures of *H. parthenopeia* in the "Annélides chétopodes du Golfe de Naples," the Australian species is to be distinguished from it by having the parapodia relatively more prominent, one of its lobes (the ventral one) being much longer than the other, and by the ventral cirrus being relatively shorter. The setæ of the European species also seem to want the long whip-like extremities.

The hypoderm consists of very irregular cells with internal fibre-like processes; and there are no glands. The alimentary canal is distinguishable into three regions—a short pharynx, a muscular dentary region, and a rather narrow intestinal region—without marked constrictions. The two first divisions are lined with columnar stratified epithelium without cilia. The epithelium of the intestine is composed of large irregular cells with clear contents and small nuclei.

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(1) "Memorie sulla storia e notomia degli animali senza vertebre," III. p. 164.

The eyes are rather complex in structure, like the eyes of many annelids, but have no lens, consisting of a thick-walled spheroidal capsule opening on the exterior; the wall of the capsule is composed of a layer of pigmented cells continued internally into radiating elongated cones the bases of which are external, while the curved pointed apices line the central cavity. In complexity of structure the eye of *Halla*, though ranking higher than that of many Polychæta, yet falls considerably below that of such forms as *Tomopteris* (1) and *Alciope* (2); it bears a very strong resemblance to the eye of *Pecten* as described by Van Haren Roman ("Voyage of the *Willem Barents*," Die Lamellibranchiaten, p. 17.)

Embedded in the substance of the nerve cord in all the specimens I have examined, in the third to the eighth segments, are a series of eight or ten oval vesicles, $\frac{1}{105}$th of an inch in diameter. These are enclosed in a capsule of fine fibrous tissue with small nuclei, except at one point where a bundle of nerve fibres enters the interior. The capsule is filled with finely granular material, and contains a second smaller spherical vesicle, about a fourth of the size of the larger one. This smaller vesicle is more homogeneous than the larger one, and contains in its interior a spherical solid body, which stains darkly with hæmatoxylin. I have been unable to determine the nature of these bodies. In structure they have the appearance of very large cells with nuclei and nucleoli, and might be supposed to be encysted unicellular parasites, but the constancy of their presence, and, more particularly, the passage into their interior of a bundle of fibres from the nerve-cord, seem to point to their being essential parts of the animal: they may be a rudimentary form of otocyst.

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(1) Vide Vejdovsky, "Beiträge zur Kenntniss der Tomopteriden" Zeitschr. f. wiss. Zool. XXXI. Bd., p. 81.

(2) Greef, "Ueber die Augen insbesondere die Retina der Alciopiden," Sitzungsb. der Gesellsch. zur Beförderung der gesammten Naturwissenschaften zu Marburg, 1875, pp. 116-138.

EXPLANATION OF PLATES.

Plate L.

Fig. 1—Head of *Syllis corruscans* from above, slightly compressed.
Fig. 2.—Extremity of everted proboscis.
Fig. 3.—Head of male.
Fig. 4.—Head of *Syllis tæniæformis* from above.
Fig. 5.—Compound seta of the same, × 210.

Plate LI.

Fig. 1.—Parapodium of *Syllis Kinbergiana* viewed from the dorsal aspect.
Fig. 2.—Tooth of the same.
Fig. 3.—Compound setæ.
Fig. 4.—Anterior portion of the body of *Syllis Schmardiana* from above.
Fig. 5.—Head of the same species from above, more highly magnified.
Fig. 6.—Head of the same from below.
Fig. 7.—Parapodium of the same.
Fig. 8.—Compound seta.

Plate LII.

Fig. 1.—*Syllis nigropunctata* ; head viewed from above.
Fig. 2.—Parapodium.
Fig. 3.—Compound seta.
Fig. 4.—*Gnathosyllis zonata* ; head viewed from above.
Fig. 5.—Jaws of the same.
Fig. 6.—Compound seta.

Plate LIII.

Fig. 1.—Head of *Staurocephalus australis.*
Fig. 2.—Teeth.
Fig. 3.—Parapodium.
Figs. 4 and 5.—Simple setæ.
Fig. 6.—Head of *Eulalia (Eumida) quadrocula.*
Fig. 7.—Parapodium of the same.
Fig. 8.—Compound seta.
Fig. 9.—Simple seta.
Fig. 10.—Head of *Psamathe (?) crinita.*

Fig. 11.—Parapodium of the same.
Fig. 12.—Compound seta of the same.

Plate LIV.

Fig. 1.—*Siphonostoma affine*, lateral view of head.
Fig. 2.—The same, ventral view of head.
Fig. 3.—Dorsal view of head shewing eyes.
Fig. 4.—Hooked seta.
Fig. 5.—Papilla.
Fig. 6.—Head of *Halla australis*.
Fig. 7.—Jaws of the same.

Plate LV.

Fig. 1.—Parapodium of *Halla australis*.
Fig. 2.—Vertical section of the mucous membrane of the œsophagus of *Halla australis*.
Fig. 3.—Vertical section of wall of intestine,
Fig. 4.—Otocyst (?) of the same, seen in section.
Fig. 5.—Vertical section of the hypoderm of *Syllis corruscans*.

NOTES FROM THE AUSTRALIAN MUSEUM.

DESCRIPTION OF TWO NEW FISHES FROM PORT JACKSON.

By E. P. Ramsay, F.R.S.E., and J. Douglas-Ogilby,

Nannocampus ruber; sp. nov.

D. 11 ; C. 6 ; Oss. rings, 19 + 50.

Head and snout very short, their length being contained $3\frac{1}{2}$ times in the distance between the gill-openings and vent; the snout is $\frac{2}{5}$ of the length of the head ; its lower side is as broad and convex as the upper, and bears a sub-gular spine. Body almost round, the ridges being obsolete. Length of body including head $\frac{4}{9}$ of that of tail. Vent a little in front of dorsal fin; caudal small. Colors when fresh, red with some minute white spots.

The specimen was obtained by the trawl off Shark Reef on the 11th ult.; it is a female, and measures $4\frac{1}{2}$ inches. Registered number B 9199.

Seriola simpex; sp. nov.

D. 7. 1/32; A. 2. 1/20; V. 1/5; P. 21; C. 18.

Length of head $4\frac{1}{10}$, height of body $3\frac{2}{3}$ in the total length. Diameter of the eye $\frac{2}{7}$ of the length of the head, and equal to that of snout. Dorsal profile much more convex than the ventral; snout rather obtuse; abdomen not compressed. Lower jaw rather the longer; maxilla reaches to behind the middle of the eye. Teeth in several rows, small, conical, pointed, and slightly curved in both jaws, each standing quite apart from those which surround it; villiform bands on the vomer, palatines, and tongue. Spines of the first dorsal short, moderately strong, the fourth the longest, ½ the height of the anterior dorsal rays; last dorsal and anal ray rather more elongate than those immediately preceding them; the free anal spines very minute; pectoral short, about one-half the length of the head; ventrals not quite two-thirds of the same; caudal forked. Scales minute; lateral line rather wavy in its anterior half. Colors, bluish-bronze above, silvery below; snout, occiput, and fins yellowish, except the ventrals, which are brown on the inner, and white on the outer surface.

The specimen from which our description has been drawn up measures 8.50 inches; it was labelled *Seriola lalandii*, but the height of the body and shortness of snout at once separate it from that species. It is probably from Port Jackson. Registered number B 9205.

NOTES FROM THE AUSTRALIAN MUSEUM.

ON SOME REMARKABLE CRYSTALS OF SIDERITE.

By F. Ratte,

"Ing. des Arts et Manuf." (Paris.)

(Plate LVI.)

The object of this note is to record the occurrence of a group of crystals of siderite or carbonate of iron, arranged in so perfect and regular a manner that the case must be considered to be very rare.

It is well-known that this mineral is frequently found in lenticular, curved, distorted or even saddle-shaped crystals. These irregularities arise from the modification termed "*equiaxe*" when the solid angles appear rounded and the faces and the edges curved. One of these crystals isolated, is shown at the foot of fig. 1 (*d*), among some lenticular crystals of calcite, and others exist on the specimen which are not shown on the figure.

The group alluded to is formed of three principal crystals, each presenting the shape of a complete saddle, only about 100° or so being wanting to make it cup-shaped. These three crystals are regularly grouped so that their axes of symmetry are at about 120° respectively. A few lenticular and curved crystals spring from the centre of the group.

This remarkable group is attached to a perfect crystal of quartz terminating in two six-sided pyramids which has itself been enveloped by a larger crystal of quartz. This specimen has been secured for the Australian Museum, and is from the auriferous quartz reefs of Sandhurst, Victoria.

EXPLANATION OF PLATES.

Fig. 1.—Group of three saddle-shaped crystals of siderite on quartz: *a*, *b*, *c* refer to each of the three crystals in this and the following figures.

d, saddle-shaped crystal of siderite, isolated among lenticular crystals of calcite, natural size.

Fig. 2.—Another view of the same.

Figs. 3 and 4.—The same group of crystals of siderite enlarged twice the natural size, showing one of the extremities of the smaller crystal of quartz.

In these last two figures the lines x, y, x', y', represent the edge of the larger crystal of quartz.

NOTES AND EXHIBITS.

Mr. Brazier exhibited specimens of *Onchidium chameleon*, described by him in his Paper, and so named on account of its many changes of colour.

Mr. Douglas-Ogilby exhibited a specimen of *Nannocampus ruber*, previously described by himself and Mr. Ramsay.

Mr. Kyngdon exhibited specimens of Penteune, a fossil fruit found at a depth of 240 feet, under a layer of basalt at the Forest Reef, in the Great Extended Gold Mine, near Bathurst.

Mr. Whitelegge exhibited a number of water insects (Notonecta), with small mollusks attached to their legs, and suggested this as a probable way of the distribution of mollusca and fish ova over the country. He also exhibited some fresh water Polyzoa killed with the tentacles fully extended by means of chloroform.

Dr. von Lendenfeld exhibited a specimen of the Alga-Pseudomorph, described in his paper, together with a specimen of the sponge itself, and a true Alga which has a similar shape to the sponge, which however is not identical with the Pseudomorph,

To illustrate his paper on the Rhizopoda Dr. v. Lendenfeld exhibited a specimen of Amœba villosa, admirably preserved in dilute osmic acid by Mr. Whitelegge.

To illustrate his paper on Onchidium, sections through the dorsal eyes of O. Dämelii were exhibited by Dr. v. Lendenfeld.

Mr. Macleay exhibited a species of *Monacanthus* taken in a trawl at Ball's Head, with the view of ascertaining if any of the members present had any knowledge of the Fish. No one seemed to know it.

He also exhibited for Mr. Wilkinson, specimens of a Fossil Crustacean from Forrest River, Cambridge Gulf, which Mr. Haswell pronounced to be a *Thalassina*, a genus which burrows in the mud of Mangrove Swamps.

Mr. Ramsay, F.R.S.E., Curator of the Australian Museum, exhibited the following fossil bones recently obtained from the tertiary deposits in the caves of Wellington Valley.

1. No. B., 6148.—The premaxillaries and scalpriform incisors of a new species of Phascolomys, *P. curvirostris*, Owen; Mr. Ramsay considered that a new genus should be created for the reception of the animal represented by this fossil, on account of the peculiar depressed and indented anterior position of the palate and peculiar curvature of the lower borders of the premaxillaries.

2. B. 5936.—This fossil represents the palate and molars of the skull of a new species of kangaroo *Palorchestes rephaim*, Owen, the form of the foremost premolar (usually represented by the formula 4 d) is different in shape, being broadly triangular with rounded cusps and the other teeth are relatively larger and the molar series longer than in other known species.

3. B. 5939.—This is the left Os innominatum, and

4. B. 5938 is the right femur of probably the same animal *P. rephaim*, Owen, while

5. B. 6442, is probably a collar bone or clavicle of the same.

WEDNESDAY, 30TH DECEMBER, 1885.

The President, Professor W. J. Stephens, M.A., F.G.S., in the chair.

Dr. Katz, Mr. T. W. E. David and Mr. Edward S. Smithurst were introduced as visitors.

MEMBERS ELECTED.

The following gentlemen were duly elected members of the Society:—T. W. Edgeworth David, Esq., B.A., F.G.S., Geological Surveyor, Department of Mines; Boughton Kyngdon, Esq., Sydney; H. R. Labatt, Esq., Appin; H. E. Cohen, Esq., Sydney.

DONATIONS.

"Zoologischer Anzeiger," VIII. Jahrg. Nos. 206, 207, 208. From the Editor.

"Comptes Rendus des Séances de l'Academie des Sciences." Paris, Tome CI., Nos. 11, 12, 13, 14 and 15, 1885. From the Academy.

"Transactions of the Entomological Society of London." Part III., 1885. From the Society.

"Nova Acta Regiæ Societatis Scientiarum Upsaliensis." Vol. XII., Fasc., II., 1885. From the Royal Society of Sciences at Upsal.

"Abstract of Proceedings of the Royal Society of Tasmania," November 16th, 1885. From the Society.

"The Plants of New South Wales." By the Rev. W. Woolls, Ph.D., F.L.S. From the Author.

"Feuille des jeunes Naturalistes," No. 181, 1st November, 1885. From the Editor.

"Mittheilungen aus der zoologischen Station zu Neapel." Sechster Band, Heft II., 1885. From the Director.

"Annales de la Société Royale Malacologique de Belgique." Tome XV., Fasc. I., 1880. Tome XIX., 1884. Procès Verbaux des Séances, January, 1885-July, 1885. From the Society.

"Bulletin de la Société Zoologique de France." Nos. 5 and 6, 1882; Nos. 1-6, 1883; Nos. 1-6, 1884; Nos. 1, 2 and 3, 1885. From the Society.

"Journal of the Royal Microscopical Society," London. Ser. II., Vol. V., Part 5. October, 1885. From the Society.

"Monatliche Mittheilungen des Naturwissenschaftlichen Vereins des Regierungsbezirkes Frankfurt." III. Jahrg., Nos. 5 and 6, August and September, 1885. From the Society.

"Note from Davos Dörfli." By A. W. Waters, F.G.S. "Chilostomatous Bryozoa from Aldinga and the River Murray Cliffs, S. Australia." By A. W. Waters, F.G.S. "On the use of the Avicularian Mandible in the determination of the Chilostomatous Bryozoa." By A. W. Waters, F.G.S. From the Author.

"Verhandlungen des Naturhistorischen Vereins der preussischen Rheinlande und Westfalens." Parts 1 and 2, 1884. From the Society.

"Bulletin de la Société Impériale des Naturalistes de Moscou." No. 1, 1885. From the Society.

"Victorian Naturalist." Vol. II., No. 8. December 1885. From the Field Naturalists' Club of Victoria.

"Science." Vol. VI., Nos., 141-145, October 16th-November 13th, 1885. From the Editor.

"Proceedings of the Academy of Natural Sciences of Philadelphia." Part II., 1885. From the Academy.

"The Canadian Record of Science." Vol. I., No. 4, 1885. From the Natural History Society of Montreal.

"Studies from the Biological Laboratory of the Johns Hopkins University." Baltimore, U.S.A., Vol. III., No. 4, 1885. "University Circulars." Vol. V., Nos. 43-44, 1885. From the University.

"Bulletin of the American Museum of Natural History." Vol. 1., No. 6, October 1885. From the Museum.

"Annuaire Géologique Universel." Par le Dr. Dagincourt. From the Author.

"The New Zealand Journal of Science." Vol. II., No. 12, November 1885. From the Editor.

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PAPERS READ.

DESCRIPTIONS OF AUSTRALIAN MICRO-LEPIDOPTERA.

By E. Meyrick, B.A., F.E.S.

XII. ŒCOPHORIDÆ—*(Continued.)*

59. Haplodyta, Meyr.

Head smooth, sidetufts small, spreading. Antennæ in ♂ moderately ciliated (1), basal joint with strong pecten. Palpi moderate, second joint reaching base of antennæ, with appressed scales, somewhat loose beneath, terminal joint rather shorter than second, slender, recurved. Thorax smooth. Forewings elongate, hindmargin very oblique. Hindwings somewhat narrower than forewings, narrowly elongate-ovate, apex round-pointed, cilia $1\frac{1}{4}$. Abdomen moderate. Posterior tibiæ clothed with long fine hairs above. Forewings with vein 7 to hindmargin, 2 from somewhat before angle of cell. Hindwings normal.

Differs from *Machaeritis* by the second joint of palpi reaching base of antennæ, and the hindwings not acutely pointed, but otherwise nearly allied to it.

1a. Head ochreous..401. *iochalca.*
1b. „ grey.
2a. Thorax ochreous.................................. 400. *heteropla.*
2b. „ grey ....399. *thoracta.*

399. *Hapl. thoracta*, n. sp.

Minor, alis ant. griseis, nitidis; post. saturatius griseis; capite ac thorace concoloribus griseis.

♂. 13-16 mm. Head, palpi, antennæ, thorax. abdomen, and legs rather dark shining bronzy-grey. Forewings elongate, rather narrow, costa moderately arched, apex round-pointed, hindmargin extremely obliquely rounded ; shining bronzy-grey, finely irrorated with paler; extreme costal edge sometimes whitish towards middle: cilia light shining bronzy-grey. Hindwings rather dark grey ; cilia grey.

Blackheath, New South Wales (3,500 feet); Fernshaw, Victoria; Deloraine, Tasmania; nine specimens in November and December.

400. *Hapl. heteropla*, n. sp.

Minor, alis ant. aereo-ochreis, nitidis ; post. saturatius griseis ; capite ac thorace discoloribus.

♂. 13-14 mm. Head, palpi, antennæ, abdomen and legs dark grey. Thorax shining bronze. Forewings elongate, rather narrow, costa moderately arched, apex round-pointed, hindmargin extremely obliquely rounded ; shining ochreous-bronze ; cilia light shining bronze. Hindwings rather dark grey ; cilia grey.

Bathurst (2,300 feet), New South Wales; four specimens in November.

401. *Hapl. iochalca*, n. sp.

Minor, alis ant. ferrugineo-ochreis ; post. saturate griseis ; capite ac thorace concoloribus ochreis.

♂. 12-13 mm. Head and thorax yellow-ochreous, somewhat ferruginous-tinged. Palpi, antennæ, abdomen and legs grey. Forewings elongate, rather narrow, costa moderately arched, apex round-pointed, hindmargin extremely obliquely rounded ; yellow-ochreous, ferruginous-tinged : cilia yellow-ochreous. Hindwings dark grey ; cilia grey.

Mount Kosciusko (4,700 feet), New South Wales ; Deloraine, Tasmania ; two specimens in December and January.

60. MACHÆRITIS, Meyr.

Head smooth, sidetufts small, loosely appressed. Antennæ in ♂ somewhat serrate, moderately ciliated (1), basal joint with strong pecten. Palpi moderate or rather short, second joint not reaching base of antennæ, with appressed scales, somewhat loose beneath, terminal joint shorter, slender, recurved. Thorax smooth. Forewings elongate, hindmargin very oblique. Hindwings narrower than forewings, ovate-lanceolate, apex acute, cilia 1-1½. Abdomen moderate. Posterior tibiæ clothed with long hairs above. Forewings with vein 7 to hindmargin, 2 from before angle. Hindwings normal.

A development of *Cæsyra*, from which it is distinguished only by the different form of the hindwings, which are lanceolate instead of elongate-ovate, and the relatively broader cilia.

1a. Forewings with ground colour white.
2a. Markings ochreous........................405. *melanospora.*
2b. ,, dark fuscous........................406. *samphoras.*
1b. Forewings with ground colour not white.
2a. Forewings with ground colour clear yellow........................402. *calligenes.*
2b. Forewings with ground colour not clear yellow.
3a. With two convergent dark streaks from inner margin........................403. *grammophora.*
3b. Without convergent dorsal streaks.
4a. With a well-defined dark spot at anal angle........................404. *heniocha.*
4b. Without dark anal spot.
5a. Ground colour yellowish, mixed with light grey........................408. *hemera.*
5b. Ground colour whitish-ochreous, irrorated with dark fuscous.
6a. Costa suffused with dark fuscous towards base........................407. *psathyra.*
6b. Costa not suffused with dark fuscous.
7a. Forewings anteriorly clear whitish-ochreous........................409. *indocta*
7b. Forewings evenly irrorated with dark fuscous throughout........................410. *aegrella.*

402. *Mach. calligenes*, n. sp.

Parva, alis ant. dilutius flavis, strigula aut maculis costæ ad basim, fasciis duabus, altera maculam flavam continente, tertia etiam marginis postici vix purpureis nigro-irroratis; post. saturatius griseis.

♂ ♀. 10-13 mm. Head and palpi light ochreous-yellow, palpi with lower half of second joint and sometimes base of terminal joint dark fuscous. Antennæ grey. Thorax light yellow, anterior half dark purplish-fuscous. Abdomen grey. Legs dark grey, posterior tibiæ and apex of joints ochreous-whitish. Forewings elongate, costa moderately arched, apex round-pointed, hindmargin very oblique, hardly rounded; ochreous-yellow; markings whitish-purplish, closely irrorated with black; a streak along basal fifth of costa, usually separated into two spots; a narrow slightly outwards-curved fascia from ⅖ of costa to middle of inner margin; a broader fascia, narrowed on costa, from ¾ of costa to anal angle, containing a spot of ground colour in disc (sometimes open posteriorly); a narrow fascia along hindmargin from apex to below middle, attenuated beneath: cilia ochreous-yellow, on anal angle irrorated with purplish-black. Hindwings rather dark grey; cilia grey.

Appears to form a connecting link with *Cæsyra*, to which it closely approaches.

Larva 16-legged, moderate, cylindrical; dull brownish-ochreous; dorsal vessel smoky-grey; head, second, and third segments black. Feeds in a portable case on lichen-dust on fences; case arch-like, both ends affixed to fence, forming a semicircular erect hoop; cylindrical, granulated with lichen-dust, mouths ragged and flapped; larva emerging at either end; feeds in August and September. This singular form of case is unique, so far as known to me.

Sydney, New South Wales; Fernshaw, Victoria; Launceston, Tasmania; Port Lincoln, South Australia; occurs tolerably commonly from October to January; the larva round Sydney in abundance.

403. *Mach. grammophora*, n. sp.

Parva, alis ant. albido-ochreis, strigula costæ basali, strigis ex dorso duabus in discum confluentibus, fascia postica bis interrupta, alteraque submarginali nigro-conspersis; post. griseis.

♂ ♀. 9-10 mm. Head, palpi, and thorax whitish-ochreous; palpi with second joint except apex, and base of terminal joint dark fuscous. Antennæ dark fuscous. Abdomen grey. Legs dark grey, ringed with whitish-ochreous. Forewings elongate, narrow, costa moderately arched, apex round-pointed, hindmargin extremely obliquely rounded; whitish-ochreous, with some scattered black scales; markings formed by an irroration of blackish scales; a streak along basal $\frac{2}{5}$ of costa, terminating in a dilated spot; an outwardly oblique streak from inner margin at $\frac{1}{3}$, and an inwardly oblique streak from before anal angle, meeting in disc before middle; a streak from $\frac{2}{3}$ of costa to anal angle, more or less distinctly divided into three spots; a streak near hindmargin from costa before apex to anal angle: cilia whitish-ochreous, basal half irrorated with dark fuscous. Hindwings grey; cilia whitish-grey.

Sydney, New South Wales, in September, October and December; rather common.

404. *Mach. heniocha*, n. sp.

Parva, alis ant. albido-ochreis, punctis disci tribus, macula parva costæ postica, alteraque dorsi ante angulum analem nigrescentibus; post. griseo-albidis.

♂ ♀. 9-11 mm. Head, palpi, thorax, and abdomen whitish-ochreous; palpi with second joint dark fuscous except towards apex. Antennæ grey. Legs whitish-ochreous, anterior pair dark grey. Forewings elongate, rather narrow, costa moderately arched, apex round-pointed, hindmargin very obliquely rounded; whitish-ochreous; markings blackish; a short streak on base of costa; a dot in disc at $\frac{2}{5}$, a second almost beneath it on fold, and a third larger in disc at $\frac{2}{3}$; a cloudy spot on costa beyond $\frac{2}{3}$, and another on inner margin before anal angle; traces of a transverse line near hindmargin: cilia whitish-ochreous. Hindwings and cilia grey-whitish.

Sydney, New South Wales, from September to March; rather common.

405. *Mach. melanospora*, n. sp.

Parva, alis ant. albis, ochreo-sparsis, punctis disci tribus, quarto anguli analis, quinto costæ ante apicem ochreis; post. albido-griseis.

♂ ♀. 10-14 mm. Head, palpi, antennæ, and thorax white; palpi with second joint externally dark fuscous except at apex. Abdomen whitish. Legs grey, posterior pair whitish, tibiæ yellowish-tinged. Forewings elongate, rather narrow, costa moderately arched, apex tolerably pointed, hindmargin extremely oblique, hardly rounded; white, more or less thinly irrorated with ochreous; markings ochreous, ill-defined: a small spot in disc at $\frac{1}{3}$, a second obliquely beyond it on fold, and a third larger in disc at $\frac{2}{3}$; a small spot on anal angle, tending to be connected with third discal spot; a small spot on costa towards apex: cilia white, with two irregular lines of dark fuscous points. Hindwings whitish-grey; cilia whitish.

Toowoomba, Queensland; Sydney, New South Wales, in December and March; rather common.

406. *Mach. samphoras*. n. sp.

Parva, alis ant. canis, dorsum versus griseo-suffusis, punctis disci quattuor, macula costæ post medium, striga anguli analis, lineaque postica transversa sub apicem suffusa saturatius fuscis; post. griseis.

♂ ♀. 11-14 mm. Head white. Palpi white, second joint dark fuscous. Antennæ grey. Thorax white mixed with grey. Abdomen grey. Legs grey, posterior pair paler. Forewings elongate, narrow, costa moderately arched, apex round-pointed, hindmargin extremely oblique, hardly rounded; white, dorsal half suffused with light grey; markings dark fuscous, rather ill-defined; a small spot in disc at $\frac{1}{3}$, a second obliquely beyond it on fold, a third in disc above middle, and a fourth in disc at ⅔, connected with anal angle by a rather thick streak; an elongate spot along costa about ⅔, tending to connect inwards with third discal spot; a curved line from costa near apex to anal angle, sharply indented inwards beneath costa, connected with a cloudy apical suffusion: cilia white, with two or three cloudy series of fuscous points. Hindwings grey; cilia grey-whitish.

Murrurundi and Sydney, New South Wales; Campbelltown, Tasmania; locally rather common, from September to December.

407. *Mach. psathyra*, n. sp.

Parva, alis ant. dilutius ochreis, saturate fusco-irroratis, costæ basi saturate fusco-suffusa, maculis disci tribus saturate fuscis; post. griseis.

♂. 10-12 mm. Head light ochreous. Palpi whitish-ochreous, second joint dark fuscous. Antennæ fuscous. Thorax light ochreous, mixed with dark fuscous. Abdomen fuscous. Legs dark fuscous, ringed with pale ochreous, posterior tibiæ pale ochreous. Forewings elongate, rather narrow, costa moderately arched, apex tolerably pointed, hindmargin extremely obliquely rounded; pale brownish-ochreous, coarsely irrorated with dark fuscous; base of costa suffused with dark fuscous; three small round dark fuscous spots, first in middle of disc, second on fold rather before first, third in disc at ¾: cilia pale greyish-ochreous irrorated with dark fuscous. Hindwings rather dark grey; cilia light grey, ochreous-tinged.

This and the three following species are closely allied; *M. psathyra* may be known by the more ochreous ground colour, coarser irroration, and marked dark suffusion of base of costa, with the darker hindwings.

Hobart, Tasmania (1000 feet), in December; five specimens.

408. *Mach. hemera*, n. sp.

Parva, alis ant. flavidis, suffuse griseo-mixtis; post. griseis.

♂. 11-12 mm. Head light yellowish mixed with grey. Palpi, antennæ, thorax, abdomen, and legs rather dark grey. Forewings elongate, rather narrow, costa moderately arched, apex tolerably pointed, hindmargin extremely obliquely rounded; ochreous-yellowish, mixed and suffused with light fuscous-grey: cilia yellowish, mixed with light grey. Hindwings grey: cilia whitish-grey.

Readily recognised by the mixed yellowish and grey ground-colour and absence of markings.

Port Lincoln, South Australia; two specimens in November.

409. *Mach. indocta*, n. sp.

Parva, alis ant. albido-ochreis, partim fusco-irroratis, punctis disci tribus obscuris saturate fuscis; post. albido-griseis; antennis annulatis.

♂ ♀. 10-13 mm. Head, palpi, antennæ, thorax, abdomen, and legs whitish-ochreous; antennæ annulated with dark fuscous; anterior and middle legs banded with dark fuscous. Forewings elongate, narrow, costa moderately arched, apex acute, hindmargin extremely oblique, slightly rounded; whitish-ochreous, posteriorly finely irrorated with light fuscous; three obscure dark fuscous dots, sometimes obsolete, first in middle of disc, second on fold rather before first, third in disc at $\frac{3}{4}$: cilia pale whitish-ochreous, finely irrorated with fuscous. Hindwings whitish-grey; cilia ochreous-whitish.

Very like the following, but the whitish-ochreous ground colour much clearer towards base, the hindwings lighter, and specially characterised by the annulated antennæ.

Brisbane, Queensland; rather common in September.

410. *Mach. ægrella*, n. sp.

Parva, alis ant. albido-ochreis, saturatius fusco-irroratis, punctis disci tribus obscuris saturate fuscis; post. griseis.

♂ ♀. 11-13 mm. Head, palpi, thorax, and abdomen pale whitish-ochreous, somewhat fuscous-tinged. Antennæ grey. Legs dark fuscous, ringed with whitish-ochreous, posterior tibiæ whitish-ochreous. Forewings elongate, narrow, costa moderately arched, apex acute, hindmargin extremely obliquely rounded; pale whitish-ochreous, greyish-tinged, closely irrorated with fuscous-grey; three obscure dark fuscous dots, first in middle of disc, second on fold rather before first, third in disc at $\frac{3}{4}$: cilia pale whitish-ochreous, irrorated with fuscous-grey. Hindwings grey; cilia ochreous-whitish, greyish-tinged.

Variable in intensity of irroration, but always much greyer than the preceding.

Sydney, Blackheath (3,500 feet), and Bathurst (2,100 feet), New South Wales; Deloraine, Campbelltown, George's Bay and Hobart, Tasmania; Wirrabara and Port Lincoln, South Australia; generally very common from August to January.

61. Aochleta, Meyr.

The characters of this and the other endemic New Zealand genera are given in full in Trans. N. Z. Inst., 1883, and need not be repeated.

411. *Aochl. psychra*, Meyr.

(*Aochleta psychra*, Meyr. Trans. N. Z. Inst., 1883, 21.)

Media, alis ant. albidis, griseo-sparsis, postice partim griseo-suffusis, punctis disci duobus minimis ocelloque nigris; post. albidis.

Castle Hill, New Zealand.

62. Semiocosma, Meyr.

412. *Sem. peroneanella*, Walk.

(*Gelechia peroneanella*, Walk.. 658; *Cryptolechia lichenella*, ib. 769; *Oecophora Huttonii*, Butl., Cist. Ent. II, 511; *Semiocosma peroneanella*, Meyr., Trans. N. Z. Inst., 1883, 22.)

Media, alis ant. dilute viridibus, signis plerisque contortis serieque punctorum marginis postici nigris; post. albidis, apicem versus griseis.

Hamilton to Dunedin, New Zealand, in December and January.

413. *Sem. picarella*, Walk.

(*Œcophora picarella*, Walk. 699; *Psecadia teras*, Feld. pl. CXL., 28; *Semiocosma picarella*, Meyr., Trans. N. Z. Inst., 1883, 23.)

Major, alis ant. niveis, strigis tribus transversis contortis, signis duobus posticis serieque punctorum marginis postici nigris ; post. griseis, disco albido-suffuso.

Dunedin, New Zealand, in January.

414. *Sem. attactella*, Walk.

(*Izatha attactella*, Walk. 787 ; *Semiocosma attactella*, Meyr., Trans. N. Z. Inst., 1883, 46.)

Major, alis ant. albidis, griseo-sparsis, vitta interrupta nigra, signis disci plerisque serieque punctorum marginis postici saturate fuscis ; post dilute griseis.

New Zealand.

415. *Sem. copiosella*, Walk.

(*Gelechia copiosella*, Walk. 1028 ; *Semiocosma copiosella*, Meyr., Trans. N. Z. Inst., 1883, 47.)

Media, alis ant. nigrescentibus, cinereo-nebulosis ; post. saturate fuscis.

Auckland, New Zealand.

416. *Sem. epiphanes*, Meyr.

(*Semiocosoma epiphanes*, Meyr., Trans. N. Z. Inst., 1883, 24.)

Media, alis ant. canis, griseo-conspersis, macula basali postice angulata alteraque costæ magna signis nigris notata saturate fuscis ; post. griseo-albidis.

Wellington, New Zealand, in January.

417. *Sem. prasophyta*, Meyr.

(*Semiocosma prasophyta*, Meyr., Trans. N. Z. Inst., 1883, 25.)

Media, alis ant. canis, virescenti-suffusis, strigula ad basim, squamis disci sparsis, punctis costæ lineaque marginis postici nigris ; post. griseis, basim versus albidis.

Taranaki and Wellington, New Zealand, in January and February.

418. *Sem. austera*, Meyr.

Semiocosma austera, Meyr., Trans. N. Z. Inst., 1883, 25.)

Media, alis ant. fuscis, fascia antica lineaque postica curva vix pallidioribus, signo disci arcuato saturatiori; post. saturate fuscis.

Wellington, New Zealand, in January.

63. Leptocroca, Meyr,

Head with appressed scales, sidetufts moderate, roughly spreading. Antennæ in ♂ with long fine cilia (4), basal joint rather elongate, with strong pecten. Palpi long, second joint somewhat exceeding base of antennæ, thickened with dense appressed scales, slightly loose beneath, terminal joint shorter than second, moderate, recurved. Thorax smooth. Forewings elongate, hindmargin oblique. Hindwings as broad as forewings, elongate-ovate, cilia ½. Abdomen moderate. Posterior tibiæ clothed with long hairs above. Forewings with vein 7 to costa, 2 from angle of cell. Hindwings normal.

Distinguished from its nearest allies by the very long ciliation of antennæ in ♂.

419. *Lept. sanguinolenta*, n. sp.

Major, alis ant. carneis, vitta supra medium inferius tridentata, lineaque submarginali nigrescentibus; post. griseo-albidis.

♂ ♀. 23-28 mm. Head and thorax flesh-colour. Palpi reddish-whitish, terminal joint and basal half of second externally dark fuscous. Antennæ dark fuscous. Abdomen grey-whitish. Legs dark fuscous, posterior pair and apex of joints grey-whitish. Forewings elongate, costa moderately arched, apex round-pointed, hindmargin very oblique, hardly rounded; flesh-colour, somewhat irrorated with grey; a thick irregular blackish streak above middle from base to apex, above more or less suffused, beneath with three short irregular projections at ¼, before middle, and at ⅔; a submarginal interrupted blackish line, sometimes indistinct: cilia light flesh-colour. Hindwings and cilia grey-whitish.

A conspicuously distinct species.

Newcastle and Sydney, New South Wales; Melbourne, Victoria; six specimens in June and July, principally at lamps.

63.* LATHICROSSA, Meyr.

420. *Lath. leucocentra*, Meyr.

(*Lathicrossa leucocentra*, Meyr., Trans. N. Z. Inst., 1883, 26.)

Minor, alis ant. saturate fuscis, maculis costæ duabus parvis serieque punctorum marginis postici albido-ochreis, punctis disci tribus niveis; post. saturate fuscis.

Dunedin, New Zealand, in January.

63.** THAMNOSARA, Meyr.

421. *Thamn. chirista*, Meyr.

(*Thamnosara chirista*, Meyr., Trans. N. Z. Inst., 1883, 27.)

Minor, alis ant. albido-fuscis, saturate fusco creberrime irroratis; post. griseis.

Christchurch, New Zealand, in December.

64. GYMNOBATHRA, Meyr.

422. *Gymn. coarctatella*, Walk.

(*Cryptolechia coarctatella*, Walk. 768; *Gymnobathra coarctatella*, Meyr., Trans. N. Z. Inst., 1883, 28.)

Media, alis ant. rufo-ochreis, punctis disci tribus saturate griseis interdum obsoletis; post. ochreo-albidis, basim versus griseo-suffusis; ♀ alis abbreviatis.

Wellington to Dunedin, New Zealand, in January.

423. *Gymn. sarcoxantha*, Meyr.

(*Gymnobathra sarcoxantha*, Meyr., Trans. N. Z. Inst., 1883, 29.)

Media, alis ant. dilute ochreis, punctis disci tribus saturate ochreo-fuscis; post. ochreo-albidis.

Christchurch to Dunedin, New Zealand, in January and March.

424. *Gymn. parca*, Butl.

(*Œcophora parca*, Butl., Proc. Zool. Soc., Lond., 1877, 405; *Œcophora limbata*, Butl., Cist. Ent. II., 560; *Gymnobathra parca*, Meyr., Trans. N. Z. Inst., 1883, 29.)

Minor, alis ant. ochreis vel flavis, interdum griseo-mixtis, costa pallidiori, punctis disci tribus saturate griseis sæpius obsoletis; post. griseis.

I have lately seen Butler's original types of *Œc. limbata*, which are certainly a common form of this species; his description is exaggerated.

Wellington to Lake Wakatipu, New Zealand, in December and January.

425. *Gymn. tholodella*, Meyr.

(*Gymnobathra tholodella*, Meyr., Trans. N. Z. Inst., 1883, 30.)

Minor, alis ant. fuscis, ochreo-conspersis, punctis disci tribus saturatioribus; post. griseis.

Hamilton to Dunedin, New Zealand, from January to March.

426. *Gymn. calliploca*, Meyr.

(*Gymnobathra calliploca*, Meyr., Trans. N. Z. Inst., 1883, 30.)

Minor, alis ant. albido-ochreis, fusco-sparsis, punctis disci tribus, costæ quinque posticis serieque marginis postici saturate fuscis; post. dilute griseis.

Dunedin, New Zealand, in January,

427. *Gymn. flavidella*, Walk.

(*Gelechia flavidella*, Walk. 655; *Œcophra utuella*, Feld. pl. CXL, 46; *Gymnobathra flavidella*, Meyr, Trans. N. Z. Inst., 1883, 31.)

Minor, alis ant. dilute flavis, punctis disci tribus nigricantibus, triangulo marginis postici inferiori dilute fusco, antice nigro-marginato, umbramque costam versus emittente, ciliis fuscis; post. albis, postice roseo-griseis.

Auckland to Christchurch, New Zealand, in January and February.

428. *Gymn. hamatella*, Walk.

(Œcophora hamatella, Walk. 700; *Gymnobathra hamatella*, Meyr., Trans. N. Z. Inst., 1883. 31.)

Minor, alis ant. albido-ochreis, interdum ochreo-suffusis, fusco-sparsis, linea transversa antica recta, altera postica angulata, punctis disci duobus strigulaque transversa, ciliis etiam saturate fuscis; post. ♂ griseis, ♀ albidis.

Christchurch and Akaroa, New Zealand, from January to March.

429. *Gymn. hyetodes*, Meyr.

(Gymnobathra hyetodes, Meyr., Trans. N. Z. Inst., 1883, 32.)

Media, alis ant. ♂ fuscis, ♀ ochreo-flavis, punctis disci tribus obscuris fasciaque postica recta nebulosa saturatioribus; post. ♂ saturate griseis, ♀ ochreo-flavis.

Wellington, New Zealand, in February.

430. *Gymn. philadelpha*, Meyr.

(Gymnobathra philadelpha, Meyr., Trans. N. Z. Inst., 1883, 33.)

Media, alis ant. griseis, leviter albido-sparsis, ciliorum apice albo; post. griseo-albidis, apice leviter griseo.

Mount Hutt, New Zealand, in January.

65. ŒCOPHORA, Z.

Head smooth, sidetufts moderate, loosely appressed. Antennæ in ♂ somewhat serrate, moderately and evenly ciliated (1), basal joint moderate, with strong pecten. Palpi moderate, second joint not exceeding base of antennæ, with appressed scales, somewhat loose beneath, terminal joint shorter than second, moderate, curved. Thorax smooth. Forewings elongate, hindmargin very oblique. Hindwings somewhat narrower than forewings, elongate-ovate, cilia $\frac{2}{3}$-1. Abdomen moderate, sometimes somewhat flattened. Posterior tibiæ clothed with long fine hairs. Forewings with vein 7 to costa, 2 from or somewhat before angle of cell, rarely stalked with 3. Hindwings normal.

Although this is the principal genus of the family in New Zealand and Europe, and probably elsewhere, it does not occupy a prominent position in Australia, where it is notwithstanding fairly represented. In the following tabulation the New Zealand species, which form a connected group not specifically allied to Australian forms, are not included, as they have been separately tabulated elsewhere.

1a. Forewings without discal dots.
2a. Costa white ... .446. *eurrhoa.*
2b. „ not white.
3a. Forewings yellow..............................431. *hemisphaerica.*
3b. „ grey..................................445. *poliocrana.*
1b. Forewings with discal dots.
2a. Face clear white.................................438. *eremæa.*
2b. Not white.
3a. Head fuscous or grey.
4a. Second discal spot directly beneath first...442. *epimicta.*
4b. „ „ „ obliquely before first...439. *zophodes.*
3b. Head whitish-ochreous or yellowish.
4a. Head mixed with reddish-fuscous..........434. *uniformis.*
4b. „ not mixed with fuscous.
5a. Hindwings yellow-ochreous..................436. *hypochalca.*
5b. „ not ochreous.
6a. Forewings clear whitish-ochreous, with dark markings.
7a. Thorax posteriorly whitish-ochreous.......443. *sulfurea.*
7b. „ wholly dark fuscous. ....432. *anthemodes.*
6b. Forewings not whitish-ochreous.
7a. Forewings dark fuscous, with whitish-ochreous spots..............................444. *lychnosema.*
7b. Forewings not dark fuscous.
8a. Anterior half of costa broadly whitish-ochreous ....433. *ochroma.*
8b. Anterior half of costa not whitish-ochreous.
9a. Basal third of costa dark grey.

10a. Second discal spot obliquely before first,
confluent ....440. *nubifera.*
10b. Second discal spot slightly beyond first...441. *lymphatica.*
9b. Basal third of costa not dark grey.........437. *lagara.*

431. *Oec. hemisphaerica*, n. sp.

Parva, alis ant. ochreo-flavis, fascia post medium perangusta fere recta serieque punctorum submarginali nigrescentibus; post. griseis.

♂ ♀. 11-12 mm. Head ochreous-yellow. Palpi yellow, lower half of second joint dark fuscous. Antennæ dark fuscous Thorax dark purplish-fuscous. Abdomen yellowish, above greyish-tinged. Legs dark fuscous, posterior pair and apex of joints yellowish. Forewings elongate, costa moderately arched, apex rounded, hindmargin very obliquely rounded; rather deep ochreous-yellow; a very small blackish spot at base of costa; a slender almost straight, slightly outwards-curved, blackish fascia from $\frac{3}{5}$ of costa to inner margin before anal angle, beyond this a faint brownish suffusion; an indistinct curved line of blackish dots very near hindmargin: cilia ochreous-yellow. Hindwings grey; cilia whitish-grey.

Brisbane, Queensland; rather common in September.

432. *Oec. anthemodes*, n. sp.

Parva, alis ant. albido-ochreis, basi saturate fusca, nebula dorsi antica, fascia etiam postica obliqua cum altera marginis postici inferius connexa dilutius fuscis, punctis disci his impositis duobus saturate fuscis; post. saturatius griseis.

♂ ♀. 9-12 mm. Head whitish-ochreous. Palpi whitish-ochreous, second-joint externally dark fuscous except at apex. Antennæ dark fuscous. Thorax dark purplish-fuscous. Abdomen grey. Legs dark fuscous, apex of joints and posterior pair whitish-ochreous. Forewings elongate, rather narrow, costa moderately arched, apex round-pointed, hindmargin very obliquely rounded; whitish-ochreous; base of wing narrowly dark purplish-fuscous; a cloudy dark fuscous dot on fold before middle, connected with inner margin by an obscure brownish-ochreous cloud ; a triangular fuscous spot on costa beyond middle, its apex touching a cloudy brownish-ochreous patch on anal angle, which generally extends along hindmargin to apex ; a dark fuscous dot in this patch in disc beyond middle : cilia whitish-ochreous, more or less suffused with pale greyish. Hindwings rather dark grey ; cilia grey.

Fernshaw and Warragul, Victoria ; Mount Wellington (1100 feet), Tasmania ; locally rather common, from November to January.

433. *Oec. ochroma*, n. sp.

Parva, alis ant. dilutius fuscis, saturatiori-irroratis, dimidio costæ antico lætius albido-ochreo, punctis disci quattuor, duobus costæ posticis albido-ochreo disjunctis, serie etiam submarginali nigrescentibus ; post. dilute griseis.

♂ ♀. 10-15 mm. Head, palpi, and antennæ whitish-ochreous ; basal half of second joint of palpi dark fuscous. Thorax fuscous, shoulders whitish-ochreous. Abdomen whitish-grey. Legs dark grey, posterior tibiæ and apex of joints whitish-ochreous. Forewings elongate, costa moderately arched, apex rounded, hindmargin rather strongly oblique, rounded ; light fuscous, irrorated with dark fuscous ; a dark fuscous spot on base of costa ; a moderately broad whitish-ochreous streak along basal half of costa, lower edge twice sinuate, sinuations filled with dark fuscous ; a cloudy dark fuscous spot on costa beyond middle, and another at $\frac{4}{5}$, between which is a cloudy whitish-ochreous spot ; four cloudy dark fuscous discal spots, first before middle, second on fold directly beneath first but more obscure, third above middle, fourth beyond middle ; a curved series of obscure dark fuscous spots very near hindmargin : cilia whitish-fuscous, towards tips more whitish. Hindwings pale grey ; cilia grey-whitish.

Sydney, New South Wales, in March and June ; eight specimens on a fence.

434. *Oec. uniformis*, n. sp.

Media, alis ant. albido-ochreis. rufescenti-conspersis, punctis disci duobus obscuris saturatius fuscis, linea postica angulata obscura rufescenti ; post. dilute griseis.

♀. 19 mm. Head and thorax whitish-ochreous, mixed with reddish-fuscous. Palpi whitish-ochreous, terminal joint and apex of second suffused with dark fuscous. Antennæ whitish-ochreous, finely annulated with dark fuscous. Abdomen whitish-grey. Legs whitish-ochreous, ringed with grey. Forewings elongate, rather narrow, costa moderately arched, apex round-pointed, hindmargin very obliquely rounded; whitish-ochreous, densely irrorated with reddish-fuscous; an obscure dark reddish-fuscous dot in disc before middle, and a second beyond middle; a very obscure angulated darker posterior transverse line: cilia whitish-ochreous, densely irrorated with reddish-fuscous. Hindwings pale grey; cilia grey-whitish.

Bathurst (2,400 feet) and Mount Canobolas (4,000), New South Wales; two specimens in April.

435. *Oec. pseudospretella*, Stt.

Media, alis ant. ochreis, saturate fusco conspersis, maculis disci tribus parvis serieque postica submarginali saturate fuscis; post. dilute griseis.

A well-known species, of which the larva feeds in skins, seeds, dry refuse, &c.

Glen Innes (3,000 feet), Bathurst (2,300 feet), Blackheath (3,500 feet), and Cooma (2,500 feet), New South Wales; Melbourne, Victoria; Launceston, Campbelltown, George's Bay and Hobart, Tasmania; Mount Graham and Port Lincoln, South Australia; Hamilton to Dunedin, New Zealand; common in houses, from November to March; introduced from Europe.

436. *Oec. hypochalca*, n. sp.

Minor, alis ant. albido-luteis, marginibus omnibus strigisque duabus posticis obliquis obscure ochreis; post. flavescentibus.

♂ ♀. 13-17 mm. Head and thorax whitish-ochreous, bronzy-tinged. Palpi and antennæ fuscous. Abdomen pale ochreous. Legs fuscous, posterior tibiæ yellowish. Forewings elongate, rather narrow, costa moderately arched, apex acute, hindmargin extremely oblique, straight or somewhat sinuate; very pale whitish-yellowish; markings very cloudy, brownish-ochreous, bronzy-shining, forming an obscure suffusion towards all margins, and two inwardly oblique streaks in disc about middle and ¾, terminating in marginal suffusion: cilia pale bronzy-ochreous. Hindwings and cilia yellow-ochreous, fuscous-tinged.

Sydney, New South Wales; several specimens in February and March.

437. *Oec. lagara*, n. sp.

Parva, alis ant. ochreo-albidis, griseo-mixtis, punctis disci circiter quinque, costæ etiam duobus posticis saturate griseis; post. dilutius griseis.

♂. 11-13 mm. Head very pale whitish-ochreous. Palpi whitish, second joint dark grey. Antennæ grey. Thorax grey-whitish, mixed with grey. Abdomen whitish-grey. Legs dark grey, posterior pair and apex of joints ochreous-whitish. Forewings elongate, rather narrow, costa moderately arched, apex round-pointed, hindmargin somewhat sinuate, extremely oblique; ochreous-whitish, irregularly irrorated with grey; markings dark grey, ill-defined; a small round spot in disc at ⅓, a second obliquely before it beneath fold, a third on fold obliquely beyond first, sometimes an additional one above third, a fourth beneath and beyond middle of disc, a fifth obliquely beyond and above fourth; two cloudy spots on costa at ⅗ and ⅘: cilia ochreous-grey-whitish. Hindwings light grey; cilia ochreous-whitish.

Rosewood, Queensland; Sydney, New South Wales; several specimens, from October to December.

438. *Oec. eremæa*, n. sp.

Minor, alis ant. acutis, griseis, cano-sparsis, punctis disci tribus obscuris saturatioribus; post. griseis; capite cano.

♂. 14-16 mm. Head white, sometimes with a grey spot on crown. Palpi dark grey, terminal joint mixed with whitish. Antennæ white, sharply annulated with dark grey. Thorax dark grey, patagia mixed with white. Abdomen grey. Legs dark grey, hairs of posterior tibiæ ochreous-whitish. Forewings elongate, rather narrow, costa gently arched, apex acute, hindmargin somewhat sinuate, extremely oblique; fuscous-grey, irrorated with white; three small cloudy somewhat darker spots, first in disc at $\frac{1}{3}$, second on fold directly beneath first, third in disc at $\frac{2}{3}$: cilia whitish-grey. Hindwings grey; cilia grey-whitish, with a cloudy grey line near base.

Toowoomba (2,000 feet), Queensland; Glen Innes (3,500 feet), New South Wales; Mount Wellington (2,500 feet), Tasmania; several specimens in December and January.

439. *Oec. zophodes*, n. sp.

Media, alis ant. acutis, griseis, punctis disci tribus lineaque postica sinuata obscuris saturatioribus, tertio duplici; post. dilutius griseis; capite griseo.

♀. 20-21 mm. Head, palpi, antennæ, thorax, abdomen, and legs fuscous-grey; hairs of posterior tibiæ ochreous-whitish. Forewings elongate, rather narrow, costa moderately arched, apex acute, hindmargin somewhat sinuate, extremely oblique; fuscous-grey, with a few whitish and dark fuscous scales; markings cloudy darker fuscous, very indistinct; a spot in disc at $\frac{1}{3}$, a second on fold obliquely before and suffusedly connected with first, and a third in disc at $\frac{2}{3}$, transversely double and more blackish; a transverse line from $\frac{3}{4}$ of costa to anal angle, sinuate inwards beneath costa: cilia pale fuscous. Hindwings light grey; cilia paler.

Blackheath (3,500 feet), New South Wales; two specimens in November.

440. *Oec. nubifera*, n. sp.

Minor, alis ant. griseis, ochreo-albido conspersis, fascia antica angusta, macula costæ post medium, punctis disci duobus lineaque postica superius indentata saturate griseis; post. griseis; capite albido-ochreo.

♂ ♀. 16-17 mm. Head whitish-ochreous. Palpi dark grey, somewhat mixed with whitish. Antennæ grey. Thorax rather dark grey. Abdomen grey. Legs dark grey, hairs of posterior tibiæ whitish. Forewings elongate, rather narrow, costa moderately arched, apex acute, hindmargin hardly rounded, extremely oblique; grey, densely irrorated or suffused with ochreous-whitish; markings cloudy, dark grey; a streak along costa and inner margin towards base; a narrow inwardly oblique fascia about $\frac{2}{5}$, tending to be interrupted into two spots in disc; a short indistinct inwardly oblique streak from costa at $\frac{3}{5}$; a small spot below middle of disc, and another in disc at $\frac{2}{3}$; a thick cloudy line from costa near apex to anal angle, sharply indented beneath costa: cilia light grey. Hindwings grey; cilia light grey.

Glen Innes (3,500 feet), New South Wales; two specimens in December.

441. *Oec. lymphatica*, n. sp.

Minor, alis ant. griseis, ochreo-albido conspersis, costæ dimidio antico, punctis disci tribus quattuorve, striga anguli analis, macula costæ post medium, lineaque postica superius indentata saturate fuscis, macula costæ ante lineam posticam ochreo-albida; post. griseis; capite albido-ochreo.

♂ ♀. 14-18 mm. Head pale ochreous or whitish-ochreous. Palpi dark fuscous, terminal joint ochreous-whitish. Antennæ, thorax, abdomen, and legs fuscous-grey; hairs of posterior tibiæ ochreous-whitish. Forewings elongate, rather narrow, costa moderately arched, apex round-pointed, hindmargin hardly rounded, extremely oblique; fuscous-grey, irrorated or partially suffused with ochreous-whitish; markings cloudy, dark fuscous; a streak along basal half of costa; a small spot in disc at $\frac{1}{3}$, a second on fold somewhat beyond first, and a third in disc at $\frac{2}{3}$, connected by a streak with anal angle; a fourth less distinct above fold near anal angle; an inwardly oblique spot from costa at $\frac{2}{3}$; an ochreous-whitish costal spot beyond this; a thick line from costa at $\frac{5}{6}$ to anal angle, indented beneath costa: cilia light fuscous-grey. Hindwings grey; cilia pale grey.

Bowenfels (2,500 feet), and Mount Kosciusko (4,300 feet), New South Wales; Deloraine and Hobart, Tasmania; rather common from November to January.

442. *Oec. epimicta*, n. sp.

Parva, alis ant. dilutius fuscis, saturatiori-irroratis, punctis disci tribus saturate fuscis ; post. dilute griseis ; capite fusco.

♂. 12-13 mm. Head, palpi, antennæ, and thorax light fuscous, mixed with dark fuscous. Abdomen light grey. Legs dark fuscous, apex of joints and posterior pair pale greyish-ochreous. Forewings elongate, costa moderately arched, apex rounded, hindmargin very obliquely rounded ; light fuscous, irrorated with dark fuscous ; a small dark fuscous spot in disc before middle, a second on fold directly beneath first, and a third in disc at ⅔ : cilia pale greyish, with one or two cloudy dark fuscous lines. Hindwings pale grey ; cilia grey-whitish.

Deloraine, Tasmania ; five specimens in November.

443. *Oec. sulfurea*, n. sp.

Minor, alis ant. sulfureis, fascia ad basim, triangulo dorsi medio, striga intus perobliqua costæ postica, signo anguli analis, macula apicis, punctis etiam disci quattuor cum his partim conjunctis saturate griseis ; post. saturatius griseis.

♂ ♀. 14-19 mm. Head and palpi pale ochreous-yellow, palpi with lower half of second joint dark fuscous. Antennæ dark fuscous. Thorax dark purplish-fuscous, posterior margin whitish-ochreous. Abdomen grey. Legs dark grey, hairs of posterior tibiæ pale yellowish. Forewings elongate, rather narrow, costa gently arched, apex tolerably pointed, hindmargin extremely obliquely rounded ; whitish-ochreous, yellowish-tinged ; markings dark grey ; a straight rather narrow blackish-grey fascia almost at base ; an irregular dot in disc at ⅓, a second on fold directly beneath first, and two transversely placed and generally confluent in disc at ⅔ ; a triangular blotch on middle of inner margin, its apex touching second discal dot ; an elongate spot along costa about ⅔, sometimes anteriorly produced into a streak reaching first discal dot ; an irregular streak from third discal dot to anal angle; a somewhat angular apical blotch, produced along hindmargin as a narrow streak to dorsal blotch: cilia grey. Hindwings rather dark grey; cilia whitish-ochreous.

Sydney, New South Wales; Adelaide and Port Lincoln, South Australia; Albany, West Australia; locally common in October and November.

444. *Oec. lychnosema*, n. sp.

Parva, alis ant. saturate fuscis, basi, puncto disci post medium, maculaque costæ postica transversa luteis; capite luteo.

♂. 11-12 mm. Head and palpi pale yellowish-ochreous, base of palpi dark fuscous. Antennæ dark fuscous. Thorax pale yellowish-ochreous, anterior margin broadly dark fuscous. Abdomen dark grey. Legs dark grey, apex of joints and hairs of posterior tibiæ whitish-ochreous. Forewings elongate, rather narrow, costa moderately arched, apex round-pointed, hindmargin very obliquely rounded; grey, densely irrorated with dark fuscous, purplish-tinged; markings pale yellowish-ochreous; a narrow basal spot; a small spot in disc beyond middle; a moderately large transverse spot from costa at ¾, reaching more than half across wing: cilia grey, irrorated with dark fuscous. Hindwings rather dark grey; cilia grey.

Sydney, New South Wales; George's Bay, Tasmania; four specimens, from November to January.

445. *Oec. poliocrana*, n. sp.

Minor, alis ant. dilute griseis, fusco-irroratis; post. griseoalbidis; capite ochreo-albido.

♂. 13-15 mm. Head and palpi ochreous-whitish, second joint of palpi suffused with dark fuscous except at apex. Antennæ fuscous. Thorax pale grey. Abdomen grey-whitish. Legs dark fuscous, posterior pair and apex of joints ochreous-whitish. Forewings elongate, narrow, costa moderately arched, apex round-pointed, hindmargin extremely obliquely rounded; pale grey, irrorated with fuscous: cilia grey-whitish, irrorated with fuscous. Hindwings and cilia grey-whitish.

Blackheath (3,500 feet), New South Wales; common in October.

446. *Oec. eurrhoa*, n. sp.

Minor, alis ant. ochreis, costa anguste nivea; post. albido-griseis, apice ochreo-tincto.

♂ ♀. 15-17 mm. Head white, crown more or less ochreous-grey. Palpi white, second joint mixed with ochreous and grey, terminal joint anteriorly grey. Antennæ whitish. Thorax brownish-ochreous. Abdomen ochreous-whitish. Legs dark grey, posterior pair ochreous-whitish. Forewings elongate, rather narrow, costa moderately arched, apex round-pointed, hindmargin extremely obliquely rounded; yellowish-ochreous; a narrow white streak along costa from base to $\frac{4}{5}$: cilia whitish-ochreous. Hindwings very pale whitish-grey, apex suffused with whitish-ochreous; cilia very pale whitish-ochreous.

Sydney, Blackheath (3,500 feet), and Bathurst (2,300 feet), New South Wales; Launceston, Tasmania; rather common from January to April.

447. *Oec. scholæa*, Meyr.

(*Oecophora scholæa*, Meyr., Trans. N. Z. Inst., 1883, 35.)

Media, alis ant. dilute griseis, rufescenti-conspersis, maculis costæ tribus anticis, punctis disci duobus, tertio plicæ post primum disci posito, lineaque postica transversa angulata saturate fuscis; post. griseis.

Wellington to Invercargill, New Zealand, from December to February.

448. *Oec. letharga*, Meyr.

(*Oecophora letharga*, Meyr., Trans. N. Z. Inst, 1883, 35.)

Minor, alis ant. albido-griseis, fusco-conspersis, maculis costæ tribus anticis nebulosis, punctis disci duobus, tertio plicæ ante primum disci posito, lineaque postica transversa angulata saturate fuscis; post. griseis.

Dunedin, New Zealand, in January.

449. *Oec. chloritis*, Meyr.

(*Oecophora chloritis*, Meyr., Trans. N. Z. Inst., 1883, 36.)

Minor, alis ant. albido-flavidis, costæ basi ac puncto sub plica posito nigris, fascia antica angusta plicam non superante, linea anguli analis obliqua, lineaque transversa postica obsoleta griseis; post griseis.

Lake Wakatipu, New Zealand, in December.

450. *Oec. epimylia*, Meyr.

(*Oecophora epimylia*, Meyr,, Trans. N. Z. Inst., 1883, 36.)

Minor, alis ant. dilute griseis, maculis costæ tribus, quarta plicæ, punctisque disci duobus obscuris saturatioribus; post. griseis; capite griseo.

Castle Hill, New Zealand, in January.

451. *Oec. contextella*, Walk.

(*Gelechia contextella*, Walk. 656; *Oecophora contextella*, Meyr., Trans. N. Z. Inst., 1883, 37.)

Minor, alis ant. canis, griseo-sparsis, fascia ad basim, altera post medium, maculis costæ duabus, lineaque postica sinuata saturate griseis, striga obliqua sub plica posita signoque disci arcuato nigris; post. dilute griseis; capite ochreo-albo.

Christchurch to Invercargill, New Zealand, in December and January.

452. *Oec. hemimochla*, Meyr.

(*Oecophora hemimochla*, Meyr., Trans. N. Z. Inst., 1883, 38.)

Minor, alis ant. albidis, griseo-conspersis, striga sub plica posita obliqua, punctis disci duobus, striga anguli analis obliqua, maculaque subapicali nigricantibus; post. albido-griseis; capite ochreo-albo.

Hamilton to Wellington, New Zealand, in January and March.

453. *Oec. griseata*, Butl.

(*Oecophora griseata*, Butl., Proc. Zool. Soc., Lond., 1877, 405; Meyr., Trans. N. Z. Inst., 1883, 39.)

Media, alis ant. dilatatis, albido-ochreis griseisve, punctis disci duobus, signo sub plica posito obliquo, macula costæ media nebulosa alteraque anguli analis saturate fuscis; post. griseo-albidis griseisve.

Christchurch to Invercargill, New Zealand, from December to March.

454. *Oec. phegophylla*, Meyr.

(*Oecophora phegophylla*, Meyr., Trans. N. Z. Inst., 1883, 39.)

Media, alis ant. dilatatis, ochreo-rufis, puncto disci strigaque dorsi indentata ochreo-albidis, partim flavo-suffusis; post. saturate griseis.

Lake Wakatipu, New Zealand, in December.

455. *Oec. oporæa*, Meyr.

(*Oecophora oporæa*, Meyr., Trans. N. Z., Inst., 1883, 40.)

Media, alis ant. saturate flavis, linea costæ basali nigrescenti, interdum punctis disci tribus rufis; post. griseis; thorace flavo.

Castle Hill, New Zealand, in January.

456. *Oec. horæa*, Meyr.

(*Oecophora horæa*, Meyr., Trans. N. Z. Inst., 1883, 40.)

Minor, alis ant. albido-ochreis, flavido-suffusis, striga costæ basali nigrescenti, signo plicæ, altero anguli analis, punctisque costæ duobus obscuris saturate fuscis; post. griseis; thorace antice saturate fusco, postice flavido.

Hamilton to Bealey River, New Zealand, in January.

457. *Oec. armigerella*, Walk.

(*Oecophora armigerella*, Walk. 698, Meyr. Trans. N. Z. Inst., 1883, 41.)

Minor, alis ant. flavis, striga costæ basali nigrescenti, interdum punctis disci duobus lineaque anguli analis obliqua saturate fuscis; post. griseis; thorace flavo, humeris anguste nigrescentibus.

Dunedin to Invercargill, New Zealand, from December to February.

458. *Oec. apanthes*, Meyr.

(*Oecophora apanthes*, Meyr., Trans. N. Z. Inst., 1883, 41.)

Minor, alis ant. dilute albido-ochreis, vix flavido-suffusis, striga costæ basali nigrescenti, macula apicis parva, interdum punctis disci tribus lineaque anguli analis obliqua saturate fuscis; post. albido-griseis; thorace dilute albido-ochreo, macula humeri interiori saturate fusco.

Hamilton, New Zealand, in January.

459. *Oec. anæma*, Meyr.

(*Oecophora anæma*, Meyr., Trans. N. Z. Inst., 1883, 42.)

Minor, alis ant. albido-ochreis, levissime griseo-irroratis, striga costæ basali, strigula anguli analis obliqua, interdum etiam signo plicæ saturate fuscis; post. griseis; thorace saturate fusco, macula lateris parva pallida.

Lake Wakatipu, New Zealand, in December.

460. *Oec. macarella*, Meyr.

(*Oecophora macarella*, Meyr., Trans. N. Z. Inst., 1883, 43.)

Minor, alis ant. dilute flavis, costæ basi nigrescenti, interdum signo plicæ lineaque anguli analis obliqua obscuris saturate fuscis; post. albido-griseis; thorace saturate fusco, margine postico anguste flavido.

Christchurch, New Zealand, in January.

461. *Oec. maranta*, n. sp.

Parva, alis ant. angustis, dilute albido-ochreis; post. griseo-albidis.

♂. 12 mm. Head, palpi, antennæ, thorax, abdomen, and legs whitish-ochreous. Forewings elongate, narrow, costa moderately arched, apex round-pointed, hindmargin extremely obliquely rounded; pale whitish-ochreous; extreme base of costa dark fuscous: cilia pale whitish-ochreous. Hindwings grey-whitish; cilia very pale whitish-ochreous.

Invercargill, New Zealand; one specimen in December.

462. *Oec. homodoxa*, Meyr.

(*Oecophora homodoxa*, Meyr. Trans. N. Z. Inst., 1883, 43.)

Minor, alis ant. albido-griseis, saturatiori irroratis, signo plicae ante medium alteroque anguli analis vix saturatioribus; post. griseis.

Lake Wakatipu, New Zealand, in December.

463 *Oec. siderodeta*, Meyr.

(*Oecophora siderodeta*, Meyr., Trans. N. Z. Inst., 1883, 43.)

Minor, alis ant. angustis, ochreis, saturate fusco-suffusis, interdum fasciis tribus obliquis obscuris, dorso sæpius basim versus pallidiori; post. saturate griseis.

Christchurch to Lake Wakatipu, New Zealand, from December to February.

464. *Oec. hoplodesma*, Meyr.

(*Oecophora hoplodesma*, Meyr., Trans. N. Z. Inst., 1883, 44.)

Minor, alis ant. angustis, dilute flavis, costæ dimidio antico, fasciis tribus obliquis quartaque marginis postici griseis; post. griseis.

South Rakaia, New Zealand, in March.

465. *Oec. chrysogramma*, Meyr.

(*Oecophora chrysogramma*, Meyr., Trans. N. Z. Inst., 1883, 44.)

Minor, alis ant. angustis, saturate flavis, basi, fasciis duabus obliquis, macula costæ postica transversa, strigaque marginis postici saturate purpureo-fuscis; post. saturate fuscis.

Wellington, New Zealand, in December.

65.* CREMNOGENES, Meyr.

466. *Cremn. aphrontis*, Meyr.

(*Cremnogenes aphrontis*, Meyr., Trans N. Z. Inst., 1883, 46.)

Minor, alis ant. ochreo-flavis, partim griseo-suffusis, puncto disci nigro; post. saturate griseis, basim versus dilutioribus; antennis ♂ brevius ciliatis.

Arthur's Pass, New Zealand, in January.

467. *Cremn. epichalca*, n. sp.

Minor, alis ant. æreo-ochreis, rarius punctis disci duobus lineaque postica transversa obscuris griseis; post. griseis; antennis ♂ longius ciliatis.

♂ 12-15 mm. Head, palpi, and thorax shining bronzy-ochreous. Antennæ dark bronzy-fuscous, ciliations 2½, whorled. Abdomen dark bronzy-grey. Legs bronzy-ochreous, anterior pair suffused with grey. Forewings elongate, costa moderately arched, apex round-pointed, hindmargin very obliquely rounded; shining bronzy-ochreous, usually without markings; rarely a dot on fold, a second in disc beyond middle, and a posterior transverse angulated line obscurely grey: cilia pale bronzy-ochreous. Hindwings grey, with purplish reflections; cilia pale greyish-ochreous.

Might readily be mistaken for a form of *C. aphrontis*, but for the entirely different antennal ciliations of the ♂, which are as in the following species.

Arthur's Pass (5,000 feet), New Zealand; several specimens in January.

468. *Cremn. oxyina*, Meyr.

(*Cremnogenes oxyina*, Meyr., Trans. N. Z. Inst., 1883, 45.)

Minor, alis ant. ♂ saturate fuscis, ferrugineo-mixtis, ♀ rufo-ochreis, fusco-mixtis, interdum striga dorsi indentata pallida; signo sub plica posito punctoque disci nigricantibus; post. saturate fuscis.

Lake Wakatipu, New Zealand, in December.

66. CROSSOPHORA, Meyr.

Head smooth, sidetufts moderate, loosely spreading. Antennæ in ♂ serrate, with long fine cilia (3-4), basal joint with strong pecten. Palpi moderate, second joint not reaching base of antennæ, with appressed scales, somewhat loose beneath, terminal joint shorter than second, moderate, curved. Thorax smooth. Forewings elongate, hindmargin very oblique. Hindwings somewhat narrower than forewings, elongate-ovate or ovate-lanceolate, cilia 1-1¼. Abdomen moderate. Posterior tibiæ clothed with long hairs. Forewings with vein 7 to costa, 2 from about angle of cell. Hindwings normal, veins 3 and 4 sometimes stalked, rarely coincident.

Differs essentially from *Oecophora*, of which it is a development, only by the long antennal ciliations of ♂.

1a. Hindwings yellowish or ochreous.
2a. Forewings with a white bar. ....474. *semiota.*
2b. „ without white markings ....473. *ænopa.*
1b. Hindwings grey or whitish.
2a. Head pale ochreous ....469. *phthorodoxa.*
2b. „ white.
3a. Discal dots blackish ....472. *thetias.*
3b. „ „ ochreous.
4a. Thorax with anterior margin dark fuscous...470. *niphadia.*
4b. „ wholly white ....471. *asyneta.*

469. *Cross. phthorodoxa*, n. sp.

Media, alis ant. griseis, saturatiori alboque conspersis, punctis disci tribus serieque postica angulata saturatioribus, strigula anguli analis alba maculam posticam saturatiorem excipiente; post. dilutius griseis; capite luteolo.

♂ ♀, 16-20 mm. Head pale ochreous. Palpi dark fuscous mixed with white. Antennæ whitish-ochreous or fuscous. Thorax white, with an anterior dark fuscous band. Abdomen grey. Legs dark fuscous mixed with ochreous-whitish. Forewings elongate, rather narrow, costa moderately arched, apex round-pointed, hindmargin extremely obliquely rounded; grey, coarsely irrorated with dark grey and whitish; five or six obscure darker spots on costa; an obscure darker dot in disc before middle, a second obliquely before it on fold, and a third more blackish in disc beyond middle, surrounded with whitish and connected with anal angle by a whitish line, followed by a suffused darker spot; an angulated transverse series of cloudy blackish spots very near hindmargin and apical part of costa: cilia grey mixed with whitish, with a series of cloudy darker spots. Hindwings grey, paler towards base; cilia grey, base ochreous-whitish.

The only species of the genus possessing an ochreous head.

Sydney and Blackheath (3,000 feet), New South Wales, in October and November; two specimens.

470. *Cross. niphadia*, n. sp.

Minor, alis ant. niveis, plus minusve ochreo-suffusis, puncto subcostali ad basim nigricante, punctis disci tribus serieque submarginali fuscis; post. albido-griseis; capite niveo.

♂ ♀. 13-18 mm. Head and antennæ white. Palpi white, second joint externally dark fuscous towards apex. Thorax white, anterior margin narrowly suffused with dark fuscous. Abdomen and legs whitish, anterior legs dark grey. Forewings elongate, rather narrow, costa moderately arched, apex round-pointed, hindmargin extremely obliquely rounded; white, somewhat suffused with pale brownish-ochreous towards margins and apex; a blackish dot near base beneath costa; a brownish-ochreous or fuscous dot in disc before middle, a second obliquely before it on fold, and a third in disc at $\frac{2}{3}$; a row of obscure fuscous dots immediately before hindmargin and apical part of costa: cilia very pale whitish-ochreous. Hindwings whitish-grey, base paler; cilia ochreous-whitish.

Brisbane and Toowoomba (2,000 feet), Queensland; Sydney, New South Wales; five specimens in September and October.

471. *Cross. asyneta*, n. sp.

Minor, alis ant. niveis, maculis duabus disci in fasciis obliquis perobscuris impositis, tertia ad dorsum media, nebula costæ anteapicali lineaque submarginali ochreis; post. griseo-albidis.

♂ ♀. 13-15 mm. Head, palpi, antennæ, and thorax white; second joint of palpi with a broad suffused dark fuscous band. Abdomen grey-whitish. Legs whitish, anterior pair suffused with dark fuscous. Forewings elongate, rather narrow, costa moderately arched, apex tolerably acute, hindmargin extremely obliquely rounded: white, with cloudy yellow-ochreous markings; a small round spot in disc before middle, and a second at $\frac{2}{3}$; these spots tend to be connected with costa and about anal angle by cloudy streaks, forming narrow oblique fasciæ: a small indistinct spot towards middle of inner margin; an indistinct subtriangular costal suffusion towards apex; a row of small very indistinct somewhat confluent spots before hindmargin: cilia ochreous-whitish. Hindwings grey-whitish; cilia ochreous-whitish.

Sydney, New South Wales, in October; three specimens.

472. *Cross. thetias*, n. sp.

Minor, alis ant. albidis, punctis disci tribus serieque submarginali nigricantibus; post. exalbidis.

♂. 13 mm. Head, palpi, antennæ, thorax, abdomen, and legs whitish; second joint of palpi externally grey; anterior margin of thorax narrowly grey; anterior and middle legs suffused with grey. Forewings elongate, narrow, costa slightly arched, apex round-pointed, hindmargin extremely obliquely rounded; white, slightly greyish-tinged; a blackish dot in disc before middle, a second on fold slightly beyond first, and a third in disc at $\frac{3}{4}$; a row of blackish dots before hindmargin and apical part of costa, terminating in two larger dots on anal angle: cilia whitish. Hindwings grey-whitish; cilia whitish.

Sydney, New South Wales; one specimen in November.

473. *Cross. œnopa*, n. sp.

Minor, alis ant. saturatius purpureo-griseis; post. luteolis, apice vix griseo.

♂ ♀. 16-17 mm. Head mixed with pale yellowish and grey. Palpi grey, edges whitish-yellowish. Antennæ dark grey. Thorax purplish-grey, sometimes with some whitish-yellowish scales towards centre. Abdomen whitish-yellowish. Legs dark fuscous, posterior pair whitish-yellowish. Forewings elongate, narrow, costa posteriorly gently arched, apex tolerably acute, hindmargin slightly sinuate, extremely oblique; rather dark purplish-grey: cilia purplish-grey, towards anal angle yellowish-tinged. Hindwings pale greyish-yellowish, towards apex somewhat greyer; cilia whitish-yellowish.

Quorn, South Australia, in October; three specimens.

474. *Cross. semiota*, n. sp.

Parva, alis ant. saturate purpureo-fuscis, nitidis, fascia antica angusta costam non attingente alba; post. subfulvis.

♂. 11 mm. Head, palpi, antennæ, thorax, and abdomen dark bronzy-grey. Legs dark grey, apex of joints and hairs of posterior tibiæ ochreous-whitish. Forewings elongate, narrow, costa gently arched, apex tolerably acute, hindmargin hardly sinuate, extremely oblique; dark shining purplish-fuscous; a rather cloudy straight somewhat oblique ochreous-white bar from inner margin before middle, reaching more than half across wing, apex suffused: cilia purplish-grey. Hindwings and cilia shining smoky-ochreous; veins 3 and 4 coincident.

It is not improbable that the coincidence of veins 3 and 4 of the hindwings may prove to be an individual characteristic, and not constant in the species; at any rate it does not at present seem necessary to separate the species generically from *C. œnopa*, to which it is in other respects apparently nearly allied.

Sydney, New South Wales; one specimen in October.

67. OCHLOGENES, Meyr.

Head with appressed scales, sidetufts small, appressed. Antennæ in ♂ moderately and evenly ciliated (1), basal joint moderate, without pecten. Palpi rather short, second joint not nearly reaching base of antennæ, somewhat dilated with appressed scales, slightly loose beneath, terminal joint shorter than second, moderate, curved. Thorax smooth. Forewings elongate, hindmargin very oblique. Hindwings $\frac{2}{3}$, ovate-lanceolate, cilia $1\frac{1}{2}$. Abdomen moderate. Middle tibiæ with median whorl of projecting scales; posterior tibiæ clothed with long hairs above. Forewings with vein 7 to costa, 2 nearly from angle of cell. Hindwings normal.

Also a development of *Oecophora*.

475. *Ochl. advectella*, Walk.

(*Gelechia advectella*, Walk. 647.)

Parva, alis ant. albis, fusco-conspersis, punctis nebulosis plerisque, tribus etiam disci insignioribus nigris; post. griseis, basim versus dilutioribus.

♂ ♀. 9-12 mm. Head and thorax ochreous-whitish, irrorated with blackish. Palpi ochreous-white, basal half of second joint and base of apical joint black. Antennæ whitish, suffusedly annulated with dark grey. Abdomen ochreous-grey-whitish. Legs dark fuscous ringed with whitish, posterior pair whitish. Forewings elongate, narrow, costa moderately arched, apex round-pointed, hindmargin extremely obliquely rounded; white, finely irrorated with fuscous; markings formed by a coarse black irroration, consisting of numerous small cloudy irregularly scattered spots, and three rather larger and more conspicuous in disc, first before middle, second on fold obliquely before first, third at $\frac{2}{3}$: cilia whitish, with a sharp black median line, base irrorated with black. Hindwings grey, becoming much paler towards base; cilia grey-whitish.

Duaringa, Queensland; Newcastle and Sydney, New South Wales; Launceston, Tasmania; in September, January, and July, not uncommon on trunks of *Eucalyptus*.

68. DISSELIA, Meyr.

Head smooth, sidetufts rather large, appressed. Antennæ in ♂ serrate, moderately strongly ciliated ($1\frac{1}{2}$), basal joint rather elongate, with strong pecten. Palpi rather short, second joint not reaching base of antennæ, with smooth appressed scales, terminal joint shorter than second, moderate, curved. Thorax smooth. Forewings elongate, hindmargin very oblique. Hindwings slightly narrower than forewings, almost ovate-lanceolate, cilia 1; in ♂ with an expanded spherical tuft of very long fine radiating hairs at base above. Abdomen somewhat flattened. Posterior tibiæ clothed with long fine hairs above. Forewings with vein 7 to costa, 2 from angle of cell. Hindwings normal.

Nearly allied to *Oecophora* and *Crossophora*, probably developed from the former; differing from all others by the spherical tuft of hairs on the hindwings of ♂.

476. *Diss. aleurota*, n. sp.

Media, alis ant. canis, griseo plus minusve suffusis, punctis disci tribus serieque submarginali saturate griseis, interdum obsoletis; post. ♂ luteolis, apice griseo, ♀ griseis.

♂ ♀. 18-22 mm. Head white. Palpi white, second joint externally grey. Antennæ grey. Thorax white, sometimes pale greyish anteriorly. Abdomen in ♂ whitish-yellowish, in ♀ grey-whitish. Legs dark grey, ringed with whitish, posterior pair whitish-yellowish. Forewings elongate, narrow, costa moderately arched, apex round-pointed, hindmargin extremely obliquely rounded; white, more or less suffusedly irrorated with grey; a dark grey dot in disc at $\frac{1}{3}$, a second on fold rather before first, and a third in disc at $\frac{2}{3}$, sometimes all obsolete; a submarginal row of dark grey dots along hindmargin and apical part of costa, often obsolete: cilia whitish-grey or whitish-yellowish. Hindwings in ♂ pale ochreous-yellowish, apex suffused with grey, in ♀ wholly grey; cilia in ♂ whitish-yellowish, in ♀ grey-whitish, round apex suffused with grey.

Wollongong and Mount Kosciusko (4,000 feet), New South Wales; Launceston, Deloraine, Campbelltown, and George's Bay, Tasmania; rather common from October to January.

69. MACROBATHRA, Meyr.

Head smooth, sidetufts small, closely appressed. Antennæ in ♂ slender, moderately and evenly ciliated (1), basal joint very elongate, very slender, without pecten or with one or two scales at base. Palpi long or very long, second joint somewhat exceeding base of antennæ, with appressed scales, smooth or somewhat loose beneath, terminal joint longer than second, slender, strongly recurved. Thorax smooth. Forewings elongate-lanceolate. Hindwings about $\frac{3}{4}$ of forewings, broadly lanceolate, cilia $1\frac{1}{2}$-2. Abdomen short, dilated and somewhat flattened. Posterior tibiæ clothed with long fine hairs above. Forewings with vein 7 running to costa, 2 from before angle, lower fork of 1 obsolete towards base of wing. Hindwings with veins 3 and 4 stalked, rarely from a point, posterior margin of cell angulated outwards on origin of 5.

A very distinct and easily recognisable genus of considerable extent, and destined to be largely increased. Although related to *Oecophora*, it has no immediate connection with that or any other known genus. The very long simple basal joint of antennæ, the terminal joint of palpi exceeding the second in length, the obsolescence of the lower fork of vein 1 of the forewings, and the angulated posterior margin of cell and usually stalked veins 3 and 4 of the hindwings are peculiarly characteristic points. The species are all elegantly marked with pale spots or fasciæ on a dark ground, and often fly in the sunshine, though some appear to be of very retired habit. Many of the larvæ are known; all feed on *Leguminosæ*, and all except one exclusively on species of *Acacia*, usually between spun leaves or phyllodia. No species are known outside Australia.

1a. Forewings with silvery-metallic markings ....500. *constrictella.*
1b. Forewings without metallic markings.
2a. With two entire anterior fasciæ ....499. *melanargyra.*
2b. Without two entire fasciæ.
3a. Thorax with posterior half white or yellowish.
4a. Markings of forewings distinctly yellow.
5a. With a single yellow band.
6a. Band nearly parallel-sided ....478. *monostadia.*
6b. ,, much broadest on costa...............479. *euryxantha.*
5b. With additional markings.
6a. Basal area coppery-fuscous ....480. *chrysotoxa.*
6b. ,, ,, pale yellowish ....481. *mesopora.*
4b. Markings white or whitish.
5a. Basal area whitish...........................482. *anemarcha.*
5b. ,, ,, dark fuscous.
6a. Median costal spot longitudinally elongate.................. .. ..484. *desmotoma*

6b. Median costal spot not elongate
7a. Antennæ wholly white ....491. *argonota.*
7b. „ annulated with dark fuscous.
8a. Abdomen grey.
9a. With a white streak along part of inner margin ... .497. *crymalea.*
9b. Without dorsal streak.
10a. Dorsal triangular spot touching fascia and anal angle ....490. *niphadobola.*
10b. Dorsal triangular spot small, separate...486. *trithyra.*
8b. Abdomen yellowish or ochreous.
9a. Cilia of forewings with a white spot below apex ....487. *euryleuca.*
9b. Cilia of forewings without subapical spot.
10a. Cilia of hindwings more or less whitish-ochreous ....485. *melanomitra.*
10b. Cilia of hindwings wholly grey ... .489. *chlorosoma.*
3b. Thorax almost wholly dark fuscous.
4a. Antennæ with apical half white ....492. *alternatella.*
4b. „ „ „ not white.
5a. Markings of forewings yellow.
6a. Anterior fascia entire ... .477. *hamaxitodes.*
6b. „ „ not reaching inner margin... ....507. *chrysospila.*
5b. Markings of forewings not yellow.
6a. Crown of head white.........................488. *melanota.*
6b. „ „ wholly whitish-ochreous..505. *brontodes.*
6c. „ „ yellow-ochreous.
7a. Forewings without pale fascia ....503. *porphyrea.*
7b. „ with white anterior fascia.
8a. Abdomen pale yellowish-ochreous ....493. *xuthocoma.*
8b. „ grey.
9a. Forewings with posterior spots rosy......495. *rhodospila.*
9b. „ „ „ „ not rosy..494. *leucopeda.*
6d. Crown of head fuscous or dark fuscous.

7a. Forewings with defined whitish postmedian dorsal spot......................506. *myriophthalma.*
7b. Forewings without defined whitish postmedian dorsal spot.
8a. Median costal spot longitudinally elongate............ . ...483. *heminephela.*
8b. Median costal spot not elongate.
9a. With pale anterior fascia.
10a. Abdomen ochreous-yellowish ....501. *ceraunobola.*
10b. „ dark grey.
11a. Forewings with a defined grey streak along inner margin ....498. *hemitropa.*
11b. Forewings without grey dorsal streak...496. *synastra.*
9b. Without pale fascia.
10a. Posterior costal spot dot-like, sharply defined ....504. *nephelomorpha.*
10b. Posterior costal spot small, cloudy.... .502. *anemodes.*

477. *Macr. hamaxitodes*, n. sp.

Minor, alis ant. luteis, macula basali saturate fusca, fascia postica latiore sub medio interrupta maculaque subapicali cum hac conjuncta purpureo-fuscis ; post. griseis.

♂ ♀. 12-14 mm. Head and palpi whitish-ochreous, palpi with base and apex dark fuscous. Antennæ dark fuscous, ringed with whitish-ochreous. Thorax dark fuscous. Abdomen pale greyish-ochreous. Legs dark fuscous, ringed with whitish-ochreous, posterior pair whitish-ochreous. Forewings elongate-lanceolate ; pale ochreous-yellowish ; a small dark fuscous basal patch, its outer edge straight, not oblique ; a rather broad straight purplish-fuscous fascia from $\frac{2}{3}$ of costa to anal angle, narrower beneath, interrupted below middle ; a narrow fuscous patch extending along upper half of hindmargin, confluent beneath with fascia above interruption ; cilia pale ochreous-yellowish, with a fuscous spot below apex. Hindwings grey ; cilia whitish-grey, yellowish-tinged.

Sydney, New South Wales, in October, November and March ; five specimens.

478. *Macr. monostadia*, n. sp.

Minor, alis ant. cupreo-fuscis, fascia antica lata recta dilute flava albo-marginata ; post. saturate fuscis.

♂ ♀. 13-15 mm. Head fuscous on crown, face pale whitish-ochreous, terminal joint anteriorly dark fuscous. Antennæ dark fuscous, sharply annulated with ochreous-whitish. Thorax pale whitish yellowish, anterior margin and a small posterior spot dark fuscous. Abdomen pale yellowish-ochreous. Legs dark fuscous, ringed with yellow-whitish, posterior pair yellow-whitish. Forewings elongate-lanceolate ; coppery-fuscous ; a broad pale ochreous-yellow laterally whitish-margined anterior transverse band, extending on costa from $\frac{1}{6}$ to middle, sides nearly parallel, hardly oblique : cilia fuscous. Hindwings dark fuscous ; cilia pale whitish ochreous.

Duaringa and Toowoomba (2,000 feet) Queensland, in December ; two specimens.

479. *Macr. euryxantha*. n. sp.

Minor, alis ant. saturate purpureo-fuscis, fascia latissima mediana inferius angustata flava, antice cano-marginata ; post. saturatius fuscis.

♀. 15 mm. Head pale yellowish, crown more ochreous-yellow, behind fuscous. Palpi whitish-yellowish, terminal joint anteriorly dark fuscous. Antennæ dark fuscous, sharply annulated with whitish. Thorax pale yellowish, sides ochreous-yellow, anterior margin dark purplish-fuscous. Abdomen ochreous-yellow, posteriorly suffused with fuscous. Legs dark fuscous, posterior pair ochreous-yellowish. Forewings elongate-lanceolate ; dark purple-fuscous ; a very broad ochreous-yellow anteriorly white-margined band, extending on costa from $\frac{1}{6}$ to $\frac{3}{4}$, on inner margin from $\frac{1}{3}$ to $\frac{3}{4}$, nearly twice as broad on costa as on inner margin, sides straight : cilia fuscous. Hindwings rather dark fuscous ; cilia light fuscous.

Duaringa, Queensland ; one specimen received from Mr. G. Barnard.

480. *Macr chrysotoxa*, n. sp.

Media, alis ant. cupreo-fuscis, triangulo costæ antico dorsum attingente flavo, linea postica transversa incurvata luteola; post. saturate fuscis.

♂ ♀. 16-19 mm. Head fuscous on crown, face whitish-yellowish. Palpi whitish-yellowish, terminal joint anteriorly dark fuscous. Antennæ dark fuscous, spotted with whitish. Thorax yellow, anterior margin dark fuscous, expanded centrally into a quadrate spot. Abdomen grey, mixed with whitish-ochreous. Legs dark fuscous, ringed with whitish-yellowish, posterior pair pale yellowish. Forewings elongate-lanceolate; coppery-fuscous; a triangular yellow patch extending on costa from near base to middle, its posterior angle narrowly produced further along costa, its apex touching inner margin about $\frac{1}{3}$; sometimes a small whitish-yellowish spot in disc below middle; a whitish-ochreous rather inwards-curved transverse line from beyond $\frac{3}{4}$ of costa to anal angle: cilia fuscous, with whitish-ochreous spots on extremities of posterior line. Hindwings dark fuscous; cilia light fuscous, on costa becoming whitish-yellowish towards tips.

Larva elongate, cylindrical; grey-whitish; subdorsal very broad, purplish-fuscous; a small fuscous spot on each segment on side; head blackish-fuscous; second segment with anterior half ochreous-yellow, posterior half blackish-fuscous. Feeds between tubularly united leaflets of *Acacia decurrens*, forming a gallery of silk and refuse. Pupa amongst refuse, affixed by tail.

Brisbane and Toowoomba (2,000 feet), Queensland; Newcastle and Sydney, New South Wales; Melbourne and Warragul, Victoria; Launceston and Hobart, Tasmania; common from September to April.

481. *Macr. mesopora*, n. sp.

Minor, alis ant. luteolis, fascia antica angusta saturate fusca, dimidio apicali cupreo-fusco maculis costæ angulique analis obscuris luteolis notato; post saturatius fuscis

♀. 14 mm. Head whitish-yellowish. Palpi whitish-yellowish, terminal joint anteriorly dark fuscous. Antennæ dark fuscous, spotted with whitish. Thorax whitish-yellowish, anterior margin dark fuscous, dilated towards middle. (Abdomen broken.) Legs whitish-yellowish, anterior and middle pair suffused with dark fuscous. Forewings elongate-lanceolate; whitish-yellowish; a narrow ill-defined rather dark fuscous fascia from $\frac{1}{5}$ of costa to $\frac{1}{3}$ of inner margin; a somewhat inwards-curved dark fuscous line from $\frac{3}{5}$ of costa to $\frac{3}{4}$ of inner margin, beyond which the apical area is wholly coppery-fuscous, except a cloudy spot on costa towards apex, and a small very indistinct spot on anal angle; cilia light fuscous, on costal and anal spots yellow-whitish. Hindwings rather dark fuscous; cilia whitish-fuscous.

Blackheath (3,500 feet), New South Wales; one specimen in January.

482. *Macr. anemarcha*, n. sp.

Minor, alis ant. luteo-albidis, macula dorsi antica transversa interdum obsoleta, fascia postica fere interrupta, altera marginis postici saturate fuscis; post. saturate fuscis.

♀. 16-17 mm. Head yellow-whitish. Palpi whitish, terminal joint anteriorly dark fuscous. Antennæ dark fuscous, annulated with white. Thorax yellow-whitish, anterior margin dark fuscous, centrally expanded into a quadrate spot. Abdomen grey. Legs dark fuscous, ringed with whitish, posterior tibiæ whitish. Forewings elongate-lanceolate; yellow-whitish; costa sometimes fuscous towards base; sometimes a transverse dark fuscous streak from fold to inner margin about $\frac{1}{3}$, dilated above, often entirely absent; a moderate ill-defined dark fuscous fascia from $\frac{2}{3}$ of costa to $\frac{3}{4}$ of inner margin, more or less distinctly interrupted below middle, narrowed on costa; a rather narrow irregular ill-defined dark fuscous fascia along hindmargin from apex almost to anal angle: cilia whitish-fuscous, on costa and beneath apex white, dark fuscous on fasciæ. Hindwings dark fuscous; cilia fuscous.

Launceston, Tasmania; four specimens in January, frequenting *Acacia decurrens.*

483. *Macr. heminephela*, n. sp.

Media, alis ant. saturatius æreo-griseis, maculis costæ tribus niveis; post. saturate fuscis.

♂ ♀. 17-20 mm. Head, palpi, antennæ, and thorax greyish-bronze, sides of face white. Abdomen yellow-ochreous. Legs dark fuscous, ringed with whitish. Forewings elongate-lanceolate; shining greyish-bronze, with clear white markings; a very small spot at base of costa; a small oblique spot on costa at $\frac{1}{5}$; an elongate semi-oval spot extending along central third of costa; a wedge-shaped inwardly oblique streak from costa near apex, reaching half across wing; sometimes a small spot on anal angle: cilia light fuscous, on costal spot white. Hindwings dark fuscous; cilia pale fuscous, towards base and on costa light ochreous-yellowish.

Launceston and Hobart, Tasmania; common from November to January; exclusively attached to *Acacia dealbata*, on which the larva must undoubtedly feed; it appears to be never found amongst the closely allied *Acacia decurrens*, even when both trees grow in the same localities.

484. *Macr. desmotoma*, n. sp.

Minor, alis ant. saturate æreo-fuscis, fascia antica latiori obliqua, macula costæ media elongata, altera ad dorsum obscura, tertia costæ ante apicem triangulari, punctoque anguli analis canis; post saturate fuscis.

♂ ♀. 14-17 mm. Head white, crown dark fuscous. Palpi white, terminal joint with dark fuscous lateral lines. Antennæ dark fuscous, spotted with white, beneath white. Thorax whitish, anterior margin dark fuscous, centrally expanded into a quadrate spot. Abdomen yellow-ochreous. Legs dark fuscous, banded with whitish-ochreous, posterior pair yellow-ochreous. Forewings elongate-lanceolate; dark bronzy-fuscous; markings white, becoming greyish or ochreous-tinged on dorsal half; a moderately broad oblique fascia from $\frac{1}{4}$ of costa to before middle of inner margin; a wedge-shaped spot extending along costa from before middle to $\frac{3}{4}$; a small cloudy spot on or near inner margin at $\frac{3}{4}$; a small triangular spot on costa towards apex, and a dot on anal angle; cilia pale yellow-ochreous, barred with fuscous on apex and middle of hindmargin. Hindwings dark fuscous; cilia pale yellow-ochreous, becoming fuscous towards apex.

Larva slender, cylindrical, pale yellowish-green; spots small, black; dorsal greyish; subdorsal broad, dark fuscous; head and second segment brownish-ochreous. Feeds in spun-up leaflets of *Acacia decurrens.*

Brisbane and Toowoomba (2,000 feet), Queensland; Newcastle and Sydney, New South Wales; Melbourne, Victoria; from September to April, very common.

485. *Macr. melanomitra*, n. sp.

Minor, alis ant. saturate fuscis, fascia antica latiore directa, maculis triangularibus costæ duabus, tertia dorsi, puncto etiam anguli analis, niveis; post. griseis, ciliorum basi luteola.

♂ ♀. 12-17 mm. Head white, crown dark fuscous. Palpi white, terminal joint with dark fuscous lateral lines. Antennæ dark fuscous, annulated with white. Thorax white, anterior margin narrowly dark fuscous, centrally expanded into a quadrate spot, and with a small posterior dark fuscous spot. Abdomen pale greyish-ochreous. Legs dark grey, banded with white, posterior pair whitish. Forewings elongate-lanceolate; dark fuscous; base of inner margin slenderly white; a moderately broad not oblique white fascia from $\frac{1}{4}$ of costa to $\frac{2}{5}$ of inner margin, outer edge somewhat bent; a triangular white spot on middle of costa, nearly meeting a similar spot on inner margin before anal angle; a smaller triangular white spot on costa at $\frac{4}{5}$, and a dot on anal angle, sometimes connected by an obscure line: cilia pale whitish-ochreous, on hind margin greyish towards tips, barred with dark fuscous at apex and above anal angle. Hindwings grey; cilia whitish-ochreous, towards tips more or less greyish.

This and the two following species are closely allied and very similar; *M. melanomitra* is best separated from *M. trithyra* by the partially whitish-ochreous cilia, but differs also in the broader fascia, and more triangular costal spots.

Bowenfels (2,500 feet), New South Wales; Mount Lofty, Wirrabara, and Quorn, South Australia; in October and January; common.

486. *Macr. trithyra, n. sp.*

Parva, alis ant. nigricantibus, fascia antica modica obliqua, maculis costæ duabus subquadratis, altera lineam emittente, tertia dorsi subtriangulari; post. saturatius æreo-fuscis, ciliis omnino griseis; abdomine griseo.

♀. 11-13 mm. Head white, crown blackish. Palpi white, terminal joint blackish. Antennæ black, spotted with white. Thorax white, anterior margin and a small posterior spot blackish. Abdomen dark grey. Legs blackish, banded with white. Forewings elongate-lanceolate; blackish; markings white, sometimes slightly ochreous-tinged; a moderate oblique fascia from $\frac{1}{4}$ of costa to $\frac{2}{5}$ of inner margin; a subquadrate spot on middle of costa, and a slightly larger one on inner margin hardly beyond it, subtriangular; a larger quadrate spot on costa, near apex, connected by a fine irregular line with a dot on anal angle: cilia dark grey, towards anal angle paler, on costal spot white. Hindwings rather dark bronzy-fuscous; cilia grey.

Differs from the preceding by the wholly grey cilia of hindwings and abdomen.

Sydney and Cooma (3,000 feet), New South Wales; Mount Lofty, South Australia; four specimens in December and January.

487. *Macr. euryleuca*, n. sp.

Minor, alis ant. saturate fuscis, fascia antica lata obliqua, maculis costæ ac dorsi obscuris, tertia costæ postica majore angulum analem attingente, quarta etiam ciliorum subapicali niveis; post. saturatius fuscis, ciliis stramineis.

♂ ♀. 15-18 mm. Head white, crown blackish. Palpi white, terminal joint with dark fuscous line on each side. Antennæ blackish, spotted with whitish. Thorax white, anterior margin very narrowly dark fuscous. Abdomen ochreous-yellowish. Legs whitish, tarsi and middle tibiæ obscurely banded with dark fuscous, posterior pair whitish-ochreous. Forewings elongate-lanceolate; dark fuscous, posteriorly somewhat ochreous-tinged; markings shining white; a broad oblique fascia from ¼ of costa to before middle of inner margin, outer edge somewhat bent; a small ill-defined spot on middle of costa; an indistinct cloudy larger spot on inner margin before anal angle; a considerably larger irregular spot on costa towards apex, suffusedly connected with anal angle: cilia fuscous, towards anal angle whitish-yellowish, on costal spot white, and with a clear white spot beneath apex. Hindwings rather dark fuscous; cilia whitish-yellowish, becoming fuscous-tinged round apex.

Differs from the two preceding by the broader fascia, the different character of the posterior spots, and especially by the subapical white spot in cilia.

Sydney and Shoalhaven, New South Wales, in December, January, and March; four specimens.

488. *Macr. melanota*, n. sp.

Minor, alis ant. nigrescentibus, fascia antica modica obliqua, maculis costæ duabus rotundatis, tertia dorsi triangulari punctoque anali niveis; post. saturatius griseis; thorace nigricante.

♀. 17 mm. Head white, sides of crown fuscous. Palpi whitish-ochreous, terminal joint with blackish line on each side. Antennæ black, spotted with whitish. Thorax purple-blackish. Abdomen yellow-ochreous. Legs whitish-ochreous, banded with blackish, tibiæ more white. Forewings elongate-lanceolate; blackish-fuscous; markings clear white, margins partially narrowly ochreous; a moderate oblique fascia from ⅕ of costa to ⅓ of inner margin; a small rounded spot on middle of costa; a rather larger flattened triangular spot on inner margin before anal angle, closely followed by an anal dot; a moderate suboval inwardly oblique spot on costa at $\frac{3}{4}$: cilia dark fuscous, on costal spot white, beneath anal angle ochreous-whitish. Hindwings rather dark grey; cilia fuscous.

Very like the following, but with the thorax wholly blackish.

Toowoomba (2,000 feet), Queensland; one specimen in December, taken amongst *Acacia decurrens*.

489. *Macr. chlorosoma*, n. sp.

Minor, alis ant. nigrescentibus, fascia antica modica obliqua, maculis costæ duabus rotundatis, tertia dorsi triangulari punctoque anali canis; post. saturate fuscis; thoracis dimidio postico cano; abdomine luteo.

♀. 16 mm. Head ochreous-white, back of crown blackish. Palpi ochreous-white, terminal joint with blackish line on each side. Antennæ black, spotted with white. Thorax white, anterior margin blackish, dilated towards middle. Abdomen pale yellow-ochreous. Legs dark fuscous, banded with white. Forewings elongate-lanceolate; blackish; markings white, slightly ochreous-tinged; a moderate oblique fascia from $\frac{1}{5}$ of costa to $\frac{1}{3}$ of inner margin; a small rounded spot on middle of costa; a rather larger acute-triangular spot on inner margin before anal angle, closely followed by an anal dot; a moderate semi-oval rather inwardly oblique spot on costa at $\frac{4}{5}$: cilia dark fuscous, on costal spot white, beneath anal angle whitish-ochreous. Hindwings dark fuscous; cilia fuscous.

Duaringa, Queensland; one specimen received from Mr. G. Barnard.

490. *Macr. niphadobola*, n. sp.

Parva, alis ant. nigrescentibus, fascia antica modica obliqua, maculis costæ duabus subtriangularibus, tertia dorsi fasciam anticam punctumque anguli analis attingente ochreo-albis; post. saturate æreo-fuscis.

♀. 12 mm. Head white, back of crown blackish. Palpi white, terminal joint black except anterior edge. Antennæ black, spotted with white. Thorax white, anterior margin and a posterior spot blackish. Abdomen grey. Legs dark fuscous, suffusedly banded with whitish. Forewings elongate-lanceolate; blackish; markings ochreous-white; a moderate oblique fascia from $\frac{1}{4}$ of costa to $\frac{2}{5}$ of inner margin; a small subtriangular spot on middle of costa; a flattened-triangular spot extending on inner margin from fascia to anal angle, followed immediately by an ill-defined dot; a small subtriangular spot on costa near apex: cilia dark fuscous, on costal spot and beneath anal angle ochreous-white. Hindwings dark bronzy-fuscous; cilia fuscous.

Differs from both the preceding by the grey abdomen; characterised by the triangular dorsal spot touching both fascia and anal dot.

Rosewood, Queensland; one specimen in September.

491. *Macr. argonota*, n. sp.

Minor, alis ant. nigris, fascia antica angustiori obliqua, macula costæ media parva, altera ante-apicali majori transversa obliqua, tertia dorsi triangulari; post. griseis; antennis albis.

♀. 15 mm. Head white on face, crown black. Palpi white, terminal joint black except anterior edge. Antennæ white, basal joint black. Thorax white, anterior margin black, dilated towards middle. Abdomen grey, with a pale ochreous basal band. Legs black, banded with white. Forewings elongate-lanceolate; black; markings snow-white; a rather narrow oblique fascia from $\frac{1}{4}$ of costa to $\frac{2}{5}$ of inner margin; a small subquadrate spot on middle of costa; a somewhat larger acute-triangular spot on inner margin before anal angle; a larger transverse-oblong inwardly oblique spot on costa at $\frac{4}{5}$: cilia dark fuscous, on costal spot white, beneath anal angle ochreous-white. Hindwings and cilia grey.

Specially characterised by the white unspotted antennæ.

Larva moderate, cylindrical, slightly tapering towards extremities, head small; ochreous-pink, segmental divisions deeper pink, with a slender pale yellowish transverse line on anterior margin of segments, and minute scattered pale yellowish dots; head and second segment black, anterior half of second segment fuscous. Feeds among irregularly spun-together phyllodia and flowers of *Acacia myrtifolia*, in September. Pupa in a fine cocoon between phyllodia.

Sydney, New South Wales; one specimen bred in October.

492. *Macr. alternatella*, Walk.

(*Gelechia alternatella*, Walk. 644.)

Minor, alis ant. saturate purpureo-fuscis, fascia antica angusta obliqua postice ochrea, puncto costæ medio, altero anguli analis, macula costæ postica obliqua albis; post. saturate æreo-fuscis, ♂ macula magna antica lutea; antennarum dimidio præter apicem niveo.

♂ ♀. 13-16 mm. Head and thorax dark fuscous, face ochreous-whitish. Palpi whitish-ochreous, terminal joint with blackish line on each side. Antennæ blackish, apical half white except tip. Abdomen yellow-ochreous, posteriorly mixed with dark grey. Legs dark fuscous, banded with white. Forewings elongate-lanceolate; very dark purplish-fuscous; markings white, slightly ochreous-tinged; a narrow oblique fascia from ¼ of costa to ⅖ of inner margin, becoming yellow-ochreous towards posterior edge; a dot on middle of costa; a slightly larger dot on anal angle; a narrow inwardly oblique spot from costa about ¾, reaching half across wing: cilia dark fuscous, on costal spot white. Hindwings dark bronzy-fuscous, in ♂ with a large pale ochreous-yellow oval patch extending from near base to beyond middle and reaching nearly to margins; cilia fuscous.

In addition to the partially yellow hindwings of ♂, the minuteness of the median costal dot is a notable characteristic.

Larva slender, cylindrical, slightly tapering posteriorly, very active; dull whitish; subdorsal broad, deep fuscous; spiracular ochreous-brown, composed of three partially interrupted lines; head and second segment brownish-ochreous. Feeds between joined leaves and shoots of *Platylobium formosum*, *Bossiæa*, and probably other *Leguminosæ*, in May and August.

Brisbane, Queensland; Sydney and Orange (3,000 feet), New South Wales; Mount Lofty, South Australia; common from August to November, and February to April.

493. *Macr. xuthocoma*, n. sp.

Minor, alis ant. nigrescentibus, fascia antica angusta obliqua dorsum non attingente, maculis costæ duabus subquadratis punctoque anguli analis ochreo-albis, fasciis tribus (tertia costam non attingente) maculaque postica his interpositis obscurissimis purpureo-plumbeis; post. saturatius fuscis; capite ochreo.

♀. 15 mm. Head whitish-ochreous, crown laterally suffused with ochreous-yellowish. Palpi ochreous-yellowish, terminal joint blackish. Antennæ dark fuscous. Thorax purple-blackish. Abdomen pale yellowish-ochreous. Legs blackish, banded with white. Forewings elongate-lanceolate; blackish; a narrow oblique ochreous-white fascia from costa at $\frac{1}{5}$, not reaching inner margin; two rather small subquadrate ochreous-white spots on costa, rounded beneath, first in middle, second at $\frac{4}{5}$; an ochreous-white dot on anal angle; an oblique fascia very near base, a direct fascia before middle, a streak from inner margin before anal angle reaching half across wing, and a small spot above anal dot very obscure purplish-leaden: cilia dark fuscous, on costal spot white. Hindwings rather dark fuscous; cilia fuscous.

Sydney, New South Wales; one specimen in March.

494. *Macr. leucopeda*, n. sp.

Parva, alis ant. nigrescentibus, fascia ad basim obscura plumbea, altera antica angusta obliqua nivea subtus grisescente, maculis costæ duabus, tertia etiam anguli analis niveis, macula dorsi postica transversa argenteo-grisea; post. griseis; capite ochreo.

♂ ♀. 10-13. mm. Head yellow-ochreous, face ochreous-whitish. Palpi whitish-ochreous, terminal joint with a blackish line on each side. Antennæ dark fuscous, obscurely spotted with whitish. Thorax dark fuscous. Abdomen grey. Legs dark fuscous, banded with white. Forewings elongate-lanceolate; blackish-fuscous; a very obscure oblique purplish-leaden fascia very near base; a narrow oblique silvery-white fascia from ¼ of costa to ⅖ of inner margin, becoming purplish-leaden at lower extremity; a small subquadrate silvery-white spot on middle of costa; a pale silvery-grey metallic rather outwardly oblique spot from inner margin at ¾, reaching half across wing; a triangular silvery-white spot on costa at ⅘, and a similar spot on anal angle, sometimes meeting: cilia dark fuscous, on costal spot white. Hindwings and cilia grey.

Larva rather elongate, somewhat tapering posteriorly; head amber; second segment black, anterior margin white; third to twelfth segments chocolate, anterior margin of each broadly clear white, posterior margin narrowly ochreous; anal shield black. Feeds on *Acacia discolor*, uniting the leaflets into a tube along midrib of leaf, in February. Pupa free, in a chamber within the tube. I have frequently met with this larva, but never on any other species of *Acacia*.

Sydney, New South Wales, in September, January, and March; rather common.

495. *Macr. rhodospila*, n. sp.

Parva, alis ant. nigriscentibus, fascia ad basim obscura plumbea, altera antica angusta obliqua nivea subtus grisescente, macula costæ media nivea altera postica tertiaque anguli analis albido-roseis, macula dorsi postica transversa plumbea; post. griseis; capite ochreo.

♂. 12 mm. Head yellow-ochreous, face ochreous-whitish. Palpi whitish-ochreous, terminal joint black except anterior edge. Antennæ dark fuscous, obscurely spotted with whitish. Thorax dark fuscous. Abdomen grey. Legs blackish, banded with white. Forewings elongate-lanceolate; blackish; a very obscure oblique leaden-grey fascia very near base; a narrow oblique silvery-white fascia from ¼ of costa to ⅖ of inner margin, becoming leaden-grey at lower extremity; a small subquadrate silvery-white spot on middle of costa; a leaden-grey metallic outwardly oblique spot from inner margin at ¾, reaching half across wing; a triangular rosy-white spot on costa at ⅘, and a similar spot on anal angle, opposite but not meeting: cilia dark fuscous, on costal spot rosy-white. Hindwings and cilia grey.

Larva cylindrical, tapering at extremities; ochreous-brown, posterior margin of all segments rather broadly white; head and second segment black, posterior margin of both white; anal segment black. Feeds between spun-together phyllodia and stem of *Acacia suaveolens*, in August.

The question of the distinctness of this species from the preceding is very perplexing; there is practically no difference between the imagos except in the pronounced rosy suffusion of the posterior spots in *M. rhodospila*, which may not prove constant, and would in any case be very probably perceptible only in bred specimens; but on the other hand the larvæ and food-plants are entirely different. Further observations are required on the present species; but meanwhile I think it impossible to describe the two forms under the head of one species.

Sydney, New South Wales; several larvæ found, and one specimen bred in September.

496. *Macr. synastra*, n. sp.

Parva, alis ant. saturate æreo-fuscis, basi albido-mixta, fascia antica angusta obliqua subtus grisescente, maculis costæ duabus tertiaque anguli analis minima niveis, macula dorsi postica obscura grisea, punctis disci tribus nigris; post. saturatius fuscis.

♂ ♀. 11-13 mm. Head brassy-fuscous, face whitish. Palpi ochreous-whitish, apex of second joint infuscated, terminal joint blackish. Antennæ black, spotted with white. Thorax bronzy-fuscous, apex of patagia sometimes whitish. Abdomen dark grey. Legs blackish, banded with white. Forewings elongate-lanceolate; dark bronzy-fuscous; markings snow-white; base slightly mixed with whitish; a narrow oblique fascia from costa at ¼, not quite reaching inner margin, becoming more or less greyish beneath; a subquadrate spot in middle of costa; a wedge-shaped rather inwardly oblique spot on costa at ¾; a very small triangular spot on anal angle nearly meeting this; a very obscure irregular oblique purplish-grey spot on inner margin at ⅔; three small round black discal spots, first beneath apex of median costal spot, second on fold before middle, third in disc at ⅔: cilia fuscous, with two obscure darker lines, on costal spot white. Hindwings rather dark bronzy-fuscous; cilia fuscous.

George's Bay, Tasmania; eight specimens in December and January.

497. *Macr. crymalea*, n. sp.

Parva, alis ant. saturate fuscis, fascia antica angusta obliqua, in dorso ♂ cum basi, ♀ cum macula proxima per strigam connexa, maculis costæ duabus, tertia dorsi postica, quarta anguli analis minima niveis, ad dorsum ochreo-tinctis; post. fuscis, ♂ area disci antica nigro-conspersa,

♂ ♀. 12 mm. Head fuscous, face whitish. Palpi whitish, terminal joint with blackish line on each side. Antennæ blackish, spotted with whitish. Thorax ochreous-white, anterior margin dark fuscous, centrally expanded into a quadrate spot. Abdomen grey. Legs dark fuscous, banded with white. Forewings elongate-lanceolate; markings snow-white, becoming ochreous-white towards inner margin; a narrow oblique fascia from ¼ of costa to ⅖ of inner margin, in ♂ connected with base by a thick streak along inner margin; a small subquadrate spot on middle of costa; a small triangular spot on inner margin at ¾, in ♀ connected with anterior fascia by a narrow streak along inner margin; a triangular spot on costa beyond ¾, and a very small spot on anal angle opposite it: cilia fuscous, on costal spot white. Hindwings fuscous, towards base semi-hyaline, in ♂ with a discal patch extending from near base to near middle strewn with black scales; cilia fuscous.

There can be no doubt that the two specimens described, which were taken together, are really the sexes of the same species; the difference of marking in the forewings is remarkable, if really a constant sexual character; the hindwings of ♂ are peculiar.

Port Lincoln, South Australia; two specimens in November; amongst *Acacia dodonæifolia.*

498. *Macr. hemitropa*, n. sp.

Minor, alis ant. saturate fuscis, fascia subbasali cum striga dorsali postice dilatata connexa dilutiori, fascia antica angusta obliqua infra obsoleta carneo-alba, maculis costæ duabis tertiaque anguli analis albis ; post. saturatius fuscis.

♀. 15 mm. Head fuscous, face ochreous-whitish. Palpi ochreous-whitish, base and apex of second joint dark fuscous, terminal joint dark fuscous except base. Antennæ blackish. Thorax and abdomen dark fuscous. Legs dark fuscous, banded with ochreous-whitish. Forewings elongate-lanceolate ; dark fuscous ; a lighter greyish-fuscous fascia very near base, continued along inner margin to anal angle as a thick streak, posteriorly dilated into a triangular spot reaching half across wing ; markings white, tinged with flesh-colour ; a rather narrow oblique fascia from costa at $\frac{1}{4}$, becoming obsolete in dorsal streak ; a moderate irregularly subquadrate spot on middle of costa ; a wedgeshaped inwardly oblique spot from costa at $\frac{4}{5}$, meeting a similar smaller spot from anal angle : cilia fuscous, on costal spot white (apex of wing damaged). Hindwings fuscous, towards apex darker ; cilia fuscous.

Wirrabara, South Australia; one specimen in October from *Acacea acinacea.*

499. *Macr. melanargyra*, n. sp.

Minor, alis ant. nigrescentibus, fascia antica modica, altera media angusta albido-griseis, ad costam niveis, macula costæ postica punctoque anguli analis niveis ; post. saturate æreo-fuscis.

♀. 14 mm. Head and thorax pale shining grey, face white, back of crown black. Palpi white, apex of second joint black, terminal joint with black line on each side. Antennæ black, spotted with white. Abdomen dark grey. Legs blackish, banded with white. Forewings elongate-lanceolate, blackish ; markings snow-white, both fasciæ suffused with pale shining grey except on costa ; a moderate fascia from $\frac{1}{4}$ of costa to $\frac{2}{5}$ of inner margin, somewhat narrowed on costa ; a narrow slightly curved fascia from middle of costa to $\frac{2}{3}$ of inner margin; a moderate subtriangular inwardly oblique spot on costa at $\frac{5}{6}$; a very small spot on anal angle: cilia blackish-grey, on costal spot white, apical third white between apex and anal angle. Hindwings dark bronzy-fuscous; cilia dark fuscous.

Brisbane, Queensland; one specimen in September.

500. *Macr. constrictella*, Walk.

(*Gelechia constrictella*, Walk. 647.)

Minor, alis ant. saturate æreo-fuscis, fasciis tribus angustis dilute aureis metallicis; post. saturatius fuscis.

♂ ♀. 13-16 mm. Head shining fuscous, face silvery-whitish. Palpi dark bronzy-fuscous, anterior edge white, second joint white towards base. Antennæ blackish, spotted with white, apical half wholly white except tip. Thorax dark bronzy-fuscous, patagia metallic golden-white. Abdomen purplish-grey. Legs blackish, banded with white. Forewings elongate-lanceolate; dark bronzy-fuscous; three slender pale golden-metallic fasciæ, forming white dots on costa; first from costa at $\frac{1}{4}$, rather oblique, not reaching inner margiu; second from middle of costa to $\frac{2}{3}$ of inner margin; third from $\frac{4}{5}$ of costa to anal angle: cilia dark fuscous, with a snow-white spot above third fascia. Hindwings and cilia rather dark fuscous.

Sydney, New South Wales; Mount Lofty, South Australia; five specimens in December and March.

501. *Macr. ceraunobola*, n. sp.

Media, alis ant. saturate fuscis, fascia antica angusta dorsum non attingente, maculis costæ duabus, puncto disci sub medio alteroque anguli analis erecto canis, striga plicæ interrupta punctoque disci postico nigris; post æreo-fuscis, basim versus grisescentibus.

♂ ♀. 19-20 mm. Head bronzy-fuscous, sides of crown yellow-ochreous, face ochreous-whitish. Palpi ochreous-whitish, terminal joint with dark fuscous line on each side. Antennæ dark fuscous, spotted with whitish. Thorax dark fuscous, apex of patagia whitish. Abdomen pale yellow-ochreous. Legs dark fuscous, banded with ochreous-whitish. Forewings elongate-lanceolate; dark fuscous, slightly purplish-tinged; base of inner margin slenderly whitish, margined above by a black streak; a narrow oblique white fascia from costa at $\frac{1}{5}$, becoming obsolete on fold, anteriorly margined by a blackish suffusion; a small subquadrate white spot on middle of costa; a white dot below middle of disc, connected with anterior fascia by a blackish streak along fold; a black dot in disc at $\frac{2}{3}$; a rounded-triangular white spot on costa beyond $\frac{3}{4}$; a small erect linear white mark on anal angle: cilia rather dark fuscous, becoming greyish-ochreous beneath anal angle, on costal spot white. Hindwings grey, posteriorly becoming bronzy-fuscous; cilia pale greyish-ochreous, more fuscous round apex.

Larva undescribed; feeds between spun-together flowers and phyllodia of *Acacia glaucescens*, in October.

Sydney and Blackheath (3,500 feet), New South Wales; Melbourne, Victoria; Hobart, Tasmania; in November and January, five specimens.

502. *Macr. anemodes*, n. sp.

Minor, alis ant. saturatius fuscis, linea antica transversa nigra, maculis costæ duabus obscurioribus albido-ochreis, punctis disci duobus nigrescentibus; post. fuscis, basim versus dilutioribus.

♂ ♀. 16-18 mm. Head and thorax rather dark fuscous. Palpi fuscous, terminal joint dark fuscous, apex whitish. Antennæ dark fuscous. Abdomen pale greyish-ochreous. Legs dark fuscous, ringed with whitish. Forewings elongate-lanceolate; rather dark fuscous; base of inner margin slenderly ochreous-whitish, margined above by a black streak; an irregular black line from $\frac{1}{6}$ of costa to $\frac{1}{3}$ of inner margin, followed towards costa by a few whitish-ochreous scales; a small obscure whitish-ochreous spot on middle of costa, sometimes almost obsolete; a black dot on fold before middle, and a dark fuscous dot in disc at $\frac{2}{3}$, tending to be preceded by an obscure whitish-ochreous dot; a small triangular tolerably defined whitish-ochreous spot on costa at $\frac{4}{5}$; sometimes an obscure whitish-ochreous dot on anal angle: cilia fuscous, beneath anal angle paler, on costal spot ochreous-whitish. Hindwings light grey, posteriorly suffused with bronzy-fuscous; cilia light fuscous.

Larva elongate, cylindrical, somewhat tapering posteriorly; rather light yellowish-green; spots minute, black; head ochreous; second segment greenish-ochreous. Feeds in loosely spun terminal shoots of *Acacia sp.*—,in October. Pupa in a firm cocoon covered with refuse. The *Acacia* on which I found these larvæ is in the opinion of Prof. Tate of Adelaide an undescribed species; it is phyllodineous, and forms large bushes fifteen feet high by the side of creeks in Wirrabara Forest.

Wirrabara, South Australia; the larvæ found plentifully, and five specimens bred in December.

503. *Macr. porphyrea*, n. sp.

Minor, alis ant. saturate purpureo-fuscis, punctis costæ duobus tertioque disci postico minimis albido-ochreis; post. griseis; capite ochreo.

♂ ♀. 15-16 mm. Head yellow-ochreous. Palpi yellow-ochreous, terminal joint dark fuscous, apex whitish. Antennæ blackish. Thorax dark purplish-fuscous. Abdomen grey. Legs dark fuscous, banded with ochreous-white. Forewings elongate-lanceolate; dark purplish-fuscous; three minute ill-defined whitish-ochreous dots; first on costa in middle, second in disc at $\frac{2}{3}$, third in costal cilia at $\frac{4}{5}$; cilia fuscous, tips and two obscure posterior lines grey-whitish. Hindwings grey, base paler; cilia light grey.

Larva undescribed; feeds among irregularly spun-together flowers and phyllodia of *Acacia myrtifolia*, in September.

Sydney, New South Wales; two specimens bred in October.

504. *Macr. nephelomorpha*, n.sp.

Minor, alis ant. saturatius æreo-fuscis, striga antica obliqua nigra dorsum non attingente, puncto costæ medio saepius obsoleto maculaque postica minima ochreo-albidis, punctis disci tribus nigrescentibus; post. fuscis, basim versus dilutioribus.

♂ ♀. 13-17 mm. Head and thorax rather dark bronzy-fuscous. Palpi ochreous-whitish, fuscous-tinged, terminal joint with blackish line on sides except at apex. Antennæ blackish, obscurely spotted with pale. Abdomen grey. Legs dark fuscous, obscurely ringed with ochreous-whitish. Forewings elongate-lanceolate ; rather dark bronzy-fuscous or ochreous-brown, irregularly irrorated with dark fuscous, sometimes purplish-tinged ; an obscure oblique blackish streak from costa at $\frac{1}{6}$, reaching to fold ; an obscure blackish dot in middle of disc, a second on fold obliquely before first, and a third in disc at $\frac{2}{3}$; an ochreous-whitish dot on middle of costa, sometimes absent ; a very small distinct ochreous-whitish spot in costal cilia at $\frac{4}{5}$: cilia fuscous, below anal angle lighter. Hindwings bronzy-fuscous, lighter towards base ; cilia fuscous.

Larva undescribed ; feeds in spun-up leaflets of *Acacia decurrens*, in September.

Toowoomba (2,000 feet), Queensland ; Sydney, New South Wales ; Hobart, Tasmania ; from October to January ; ten specimens.

505. *Macr. brontodes*, n. sp.

Minor, alis ant. saturatius fuscis, fascia antica directa interdum obsoleta, maculis costæ duabus tertiaque dorsi obscura albido-ochreis, annulo disci postico saturate fusco ; post. fuscis ; capite albido-ochreo.

♀. 14-15 mm. Head and palpi pale whitish-ochreous, terminal joint of palpi with blackish line on each side. Antennæ dark fuscous, obscurely spotted with whitish-ochreous. Thorax dark fuscous. Abdomen fuscous. Legs dark fuscous, suffusedly banded with whitish-ochreous. Forewings elongate-lanceolate ; fuscous, purplish-tinged, densely irrorated with dark fuscous ; markings pale ochreous or whitish-ochreous, suffusedly margined with dark fuscous ; a moderate direct fascia from $\frac{1}{4}$ of costa to $\frac{1}{3}$ of inner margin, nearly obsolete on costa, sometimes throughout ; a small irregular spot on middle of costa ; a very obscure spot on inner margin at $\frac{3}{5}$, separated from costal spot by a dark fuscous suffusion ; an obscure dot in disc at $\frac{2}{3}$, surrounded by a distinct dark fuscous ring ; a small subtriangular spot on costa at $\frac{4}{5}$; an obscure ochreous-whitish dot on anal angle : cilia whitish-ochreous, with two cloudy fuscous shades, on middle of hindmargin and above apex broadly barred with fuscous, on costal spot whitish. Hindwings fuscous; cilia light fuscous, towards base whitish-ochreous.

Rosewood, Queensland; three specimens amongst dense scrub in September.

506. *Macr. myriophthalma*, n. sp.

Minor, alis ant. saturate purpureo-fuscis, fascia antica angusta obliqua, maculis costæ duabus parvis, etiam dorsi duabis minoribus, punctoque disci postico albido-ochreis, nigro-cinctis; post. saturatius fuscis; capite fusco, utrinque lutescente.

♂ ♀. 14-16 mm. Head shining fuscous, sides whitish-ochreous. Palpi whitish-ochreous mixed with blackish, terminal joint with blackish line on each side. Antennæ dark fuscous, obscurely spotted with whitish-ochreous. Thorax dark purplish-fuscous. Abdomen grey. Legs dark fuscous, banded with ochreous-whitish. Forewings elongate-lanceolate; dark purple-fuscous; markings whitish-ochreous, margined with black, well-defined; a narrow fascia from $\frac{1}{4}$ of costa to $\frac{2}{5}$ of inner margin, obsolete at lower extremity; a small spot on middle of costa, and a smaller one opposite it on inner margin; a dot in disc at $\frac{2}{3}$; a small triangular spot on costa at $\frac{4}{5}$, and a much smaller spot on anal angle opposite: cilia fuscous, on costal spot whitish-ochreous. Hindwings rather dark fuscous; cilia fuscous.

Larva undescribed; feeds in spun-up leaflets of *Acacia pubescens*, in August.

Brisbane, Queensland; Sydney, New South Wales; Melbourne, Victoria; in September, November, and March, rather common.

507. *Macr. chrysospila*, n. sp.

Minor, alis ant. purpureo-fuscis, macula basali parva, fascia antica augustiori dorsum non attingente, maculis costæ duabus, tertia dorsi, quarta anguli analis parva, puncto etiam disci postico flavis, nigrescenti-cinctis; post. saturatius griseis.

♂ ♀. 14-16 mm. Head pale shining fuscous, sides ochreous-yellow. Palpi whitish-yellowish, somewhat mixed with dark fuscous, terminal joint with dark fuscous line on each side. Antennæ dark fuscous, spotted with whitish-yellowish. Thorax bronzy-fuscous, with a small yellowish posterior spot. Abdomen fuscous, becoming pale ochreous-yellowish towards base. Legs dark fuscous, banded with whitish-yellowish. Forewings elongate-lanceolate; purplish-fuscous, margins suffusedly irrorated with dark fuscous; markings ochreous-yellow, suffusedly margined with dark fuscous; a small basal spot; a rather narrow irregular oblique fascia from $\frac{1}{5}$ of costa, not reaching inner margin; an irregular spot about middle of costa, and a second on inner margin opposite; a small round spot in disc at $\frac{2}{3}$; a trapezoidal spot on costa at $\frac{4}{5}$, and a smaller triangular spot on anal angle: cilia fuscous, beneath anal angle paler, on costal spot yellow. Hindwings rather dark grey; cilia pale fuscous.

Brisbane, Queensland; four specimens in September.

70. SATRAPIA, Meyr.

Head smooth, sidetufts small, closely appressed. Antennæ in ♂ with long fine cilia (4), basal joint moderate, with moderate pecten. Palpi rather short, second joint not nearly reaching base of antennæ, slender, smoothly scaled, terminal joint shorter than second, slender, curved. Thorax smooth. Forewings broadly-lanceolate. Hindwings half as broad as forewings, lanceolate, acute, cilia 2½-3. Abdomen moderately broad. Posterior tibiæ clothed with long fine hairs above. Forewings with vein 7 to costa, lower angle of cell obsolete. Hindwings normal.

Nearly allied to *Oecophora*, of which it is a development. The larva of the single species is a leaf-miner, and has the legs in a partially rudimentary condition.

508. *Satr. thesaurina*, n. sp.

Parva, alis ant. aurantiacis, fascia antica costam non attingente nigra, antice per lineam griseam metallicam in costam productam marginata, lineis disci longitudinalibus tribus griseis metallicis, fascia marginis postici nigrescente; post. saturate fuscis.

♂ ♀. 10-12 mm. Head, palpi, antennæ, thorax, abdomen, and legs shining rather dark grey; palpi internally whitish; patagia orange. Forewings lanceolate; orange; two metallic grey dots transversely placed very near base, upper connected with base of costa, and lower with middle of base of wing, by black dots; a thick black erect streak from middle of inner margin, reaching $\frac{3}{4}$ across wing, dilated at base, anteriorly margined with metallic grey, its apex connected with $\frac{1}{5}$ of costa by an oblique metallic grey line; three parallel linear longitudinal metallic grey streaks in disc, anteriorly terminating in black erect streak, posteriorly reaching to near hindmarginal border; a narrow blackish hindmarginal border, extending from apex to below anal angle, rather dilated at extremities: cilia dark fuscous. Hindwings and cilia dark fuscous.

Larva with abdominal legs rudimentary, almost obsolete; elongate, gradually tapering posteriorly from sixth segment; dull light ochreous-reddish; head small, black; second segment broader than head, narrower than third, dark fuscous, anteriorly lighter and more ochreous; anal segment small, black. Mines a short tubular gallery, open at both ends, adjoining midrib, in leaves of *Eucalyptus tereticornus* (*Myrtaceæ*), emerging from anterior end to feed and eating holes in the leaf, ejecting excrement from posterior end; often three or four larvæ in one leaf. Pupa free within the gallery. Larva feeding in September and October.

Sydney, New South Wales; Melbourne, Victoria; Adelaide, South Australia; in October and November; rarely captured, but bred in plenty from the larva, which is locally abundant.

APPENDIX 1.

The foregoing species complete the original scheme of the family; but as the publication has extended over a period of three years, a considerable number of additional species have come into my hands since the completion of the genera to which they are referable. These will now be added in the form of an appendix; the species will continue to be numbered in ordinal succession, but a second number will be added in brackets, which will indicate the position of each species in relation to those already described. I propose to include in a second appendix additional localities and notes on the species previously mentioned.

PALPARIA, Wing.

509. (4a.) *Palp. theophila*, n. sp.

Major, alis ant. margine postico sinuato, ochreo-roseis, ciliis griseis; post. roseo-albis.

♂. 25-27 mm. Head yellow-ochreous, partially rosy-suffused. Palpi with tuft of second joint dense, as long as terminal joint; dull rosy, upper edge of tuft and terminal joint whitish. Antennæ white. Thorax yellowish-rosy. Abdomen white. Legs rosy-white. Forewings moderate, costa strongly arched, apex acute, not produced, hindmargin slightly sinuate, oblique; bright rosy, slightly ochreous-tinged; extreme base yellowish; costal edge yellow-whitish: cilia of hindmargin grey, base purplish-rosy. Hindwings rosy-white; cilia white.

Nearest to *P. rectiorella*, but immediately separated by the deep rosy colour and grey hindmarginal cilia; the hindwings in *P. rectiorella* should have been described as pale whitish-yellowish, whereas in *P. theophila* they have no yellowish tinge.

Deloraine, Tasmania; two specimens from *Leptospermum* in November and December.

510. (7a.) *Palp. mesophthora*, n. sp.

Media, alis ant. margine postico vix sinuato, dilute roseo-griseis, costæ punctis quattuor posticis lineisque duabus transversis obscuris, interdum etiam nebula basali magna maculave dorsi media saturate fuscis; post. albidis, apice leviter roseo-griseo.

♂ ♀. 19-22 mm. Head, palpi, antennæ, and thorax whitish-ochreous, fuscous-tinged; palpi with tuft of second joint reduced to a very short triangular apical projection, second joint externally fuscous, apex whitish, terminal joint nearly as long as second. Abdomen and legs whitish, anterior and middle legs suffused with dark fuscous. Forewings elongate, costa gently arched, sinuate in middle, apex round-pointed, hindmargin slightly sinuate, oblique; light reddish-grey, finely and thinly irrorated with dark fuscous; costal edge ochreous-whitish except at base; a very small cloudy dark fuscous spot on middle of costa, and three equidistant cloudy dark fuscous costal dots between this and apex; sometimes a moderate round dark fuscous spot in middle of inner margin; sometimes anterior half of wing obscurely suffused with rather dark fuscous; traces of an obscure curved cloudy dark fuscous line from central costal spot to anal angle, and a similar waved line from last costal dot to anal angle; a hindmarginal row of dark fuscous dots: cilia whitish-ochreous, base reddish-tinged, somewhat mixed with dark fuscous, and with a dark fuscous spot at apex. Hindwings whitish, apex pale greyish; cilia whitish, towards apex rosy-tinged.

A variable species, most allied to *P. micrastrella*, but not capable of being confused with it.

Deloraine and Mount Wellington (2,500 feet), Tasmania; three specimens amongst *Leptospermum* in November and December.

511. (8a.) *Palp. hesychæa*, n. sp.

Media, alis ant. dilutissime griseo-ochreis, lineis transversis nebulosis subcurvis tribus saturatioribus, punctis costæ posticis tribus saturate fuscis; post. exalbidis.

♀. 22 mm. Head, palpi, antennæ, and thorax whitish, finely irrorated with pale greyish-ochreous; tuft of palpi dense, nearly as long as terminal joint. Abdomen and legs whitish, anterior tibiæ and tarsi fuscous. Forewings moderate, dilated posteriorly, costa slightly arched, apex round-pointed, hindmargin rather sinuate, somewhat oblique; very pale whitish-ochreous, greyish-tinged; three indistinct cloudy greyish-ochreous transverse lines, somewhat curved; first from $\frac{1}{3}$ of costa to middle of inner margin, second from middle of costa to $\frac{3}{4}$ of inner margin, third from $\frac{3}{4}$ of costa to anal angle; three dark fuscous dots on costa between middle and apex: cilia ochreous-whitish, round apex and upper half of hindmargin with a cloudy dark fuscous terminal line. Hindwings and cilia whitish, slightly ochreous-tinged.

Allied to *P. euryphanella*, but differing conspicuously in the very pale forewings, without fuscous tinge, and whitish hindwings.

Mount Kosciusko, (4700 feet). New South Wales; one specimen in January.

512. (11a.) *Palp. lithocosma*, n. sp.

Media, alis ant. angustis, subfalcatis, ochreo-rubris, fascia lata media angulata grisea niveo-marginata; post. dilutius griseis.

♀. 21 mm. Head grey, sidetufts whitish. Palpi with second joint long, tuft rather short, dense, terminal joint about half second; second joint reddish-fuscous, upper edge white, terminal joint whitish. Antennæ grey. Thorax grey, patagia whitish. Abdomen light grey. Legs reddish-grey, hairs of posterior tibiæ whitish. Forewings elongate, rather narrow, costa moderately arched, apex strongly produced, acute, hindmargin sinuate, very oblique; ochreous-red; a pale ochreous-yellowish suffusion forming a very obscure angulated anterior fascia; two snow-white, anteriorly fuscous-edged, posteriorly ill-defined, transverse lines, acutely angulated in middle, bent inwards below middle, first from $\frac{1}{3}$ of costa to fold before middle, second from $\frac{3}{5}$ of costa to anal angle, included space brownish-grey; second line margined posteriorly by a light ochreous-yellowish suffusion: cilia grey, reddish-tinged. Hindwings rather light grey; cilia whitish-grey.

Allied to *P. falcifera*, but very different.

One specimen, as to the locality of which I have not yet received information, in the collection of Dr. Lucas, of Melbourne.

ENCHOCRATES, Meyr.

513. (14a.) *Ench. picrophylla*, n. sp.

Media, alis ant. dilute ochreo-griseis, costa, venis, lineisque tribus transversis valde curvatis obscuris carneis, punctis disci duobus serieque marginis postici saturate fuscis; post. griseo-albidis.

♂. 20-21 mm. Head, palpi, antennæ, and thorax pale ochreous-greyish; antennæ rosy-tinged towards base. Abdomen light grey. Legs whitish, anterior pair dark grey, tibiæ rosy, middle tarsi grey except apex of joints. Forewings oblong, moderately broad, costa moderately arched, strongly towards base, apex rounded, hindmargin obliquely rounded; pale ochreous-grey; costal edge, inner margin, and all veins obscurely lined with dull flesh-colour; a fuscous dot beneath costa at $\frac{1}{6}$; a dark fuscous dot on fold before middle, and a second in disc at $\frac{2}{3}$; three very obscure dull flesh-colour transverse lines, first from $\frac{1}{3}$ of costa, becoming obsolete beneath, second from middle of costa to anal angle, very strongly angulated in middle, third from $\frac{3}{4}$ of costa to anal angle, strongly curved above middle; a row of well-defined dark fuscous dots along hindmargin and apical part of costa; cilia whitish-grey, tips pale rosy round apex. Hindwings and cilia grey-whitish.

A much duller insect than *E. glaucopis*, easily distinguished by the absence of the bright rosy tints and of the pale yellowish dorsal spot with its attendant markings.

Sydney, New South Wales; Mount Lofty, South Australia (Mr. E. Guest); in June; two specimens.

EOCHROIS, Meyr.

I have altered this name to its present form, on the ground that *Eochroa* has been previously employed by Felder for a genus of *Lepidoptera*.

514. (24a.) ***Eochr. tritoxantha***, n. sp.

Media, alis ant. fusco-purpureis, area basali flava, puncto disci postico luteolo; post. griseis.

♂. 18 mm. Head, palpi, and thorax deep yellow. Antennæ dark fuscous, spotted with white. Abdomen grey. Legs dark grey, apex of joints white, posterior pair whitish. Forewings moderately elongate, costa gently arched, apex round-pointed, hindmargin rather strongly sinuate, oblique; fuscous-purplish, becoming fuscous towards costa posteriorly; basal third deep yellow, bounded by a line from $\frac{1}{3}$ of costa to middle of inner margin; costal edge whitish-ochreous on posterior half; a whitish-ochreous dot in disc at $\frac{2}{3}$; cilia whitish, with a dark grey apical spot, basal half dark grey on upper half of hindmargin, and a grey spot on anal angle. Hindwings grey; cilia whitish-grey.

Very distinct from any other; in form of wing nearest *E. acutella*.

Deloraine, Tasmania; one specimen from *Leptospermum* in December, taken after dark.

ZONOPETALA, Meyr.

515. (30a.) *Zon. synarthra*, n. sp.

Media, cana, thorace antice nigro, alis ant. costæ basi, fascia antica, altera postica angustiore antice ochreo-marginata, punctoque disci postico transverso nigris; post. luteolis, postice griseo-suffusis.

♂ ♀. 15-21 mm. Head white. Palpi white, lower half of second joint blackish. Antennæ dark fuscous. Thorax white, anterior half blackish. Abdomen pale yellowish-ochreous. Legs dark fuscous, posterior pair pale yellowish-ochreous. Forewings moderate, costa moderately arched, apex round pointed, hindmargin hardly rounded, oblique; white, sometimes faintly yellowish-tinged; markings blackish; a small spot on base of costa; two straight fasciæ, their posterior edges irregularly dentate; first moderate, from ⅖ of costa to beyond middle of inner margin; second narrow, anteriorly generally suffusedly margined with whitish-ochreous, from ¾ of costa to anal angle; a transverse linear dot in disc between these, nearer second; beneath this a cloudy grey dot; a cloudy grey spot on hindmargin beneath apex; a dot on costa before apex, and a hindmarginal line, interrupted above anal angle: cilia whitish-ochreous, basal half on hindmargin white spotted with grey, with a blackish apical spot. Hindwings whitish-ochreous, apex greyish, in ♀ wholly grey except towards base; cilia whitish-ochreous, with a cloudy grey basal line.

Differs from all by the conspicuous separate black discal dot; the nearest species is *Z. decisana*, in which alone the discal dot is present, but united at its lower extremity with the anterior fascia, and the posterior markings are reddish-brown.

Mount Kosciusko (4,700 feet), New South Wales, in January; Quorn, South Australia, in October; locally rather common.

516. (31a.) *Zon. erythrosema*, n. sp.

Media, carnea, alis ant. macula disci antica partim rubromarginata fasciaque postica sinuata antice suffusa nigricantibus; post. griseis.

♂. 18 mm. Head whitish. Palpi rosy-whitish, basal half of second joint blackish. Antennæ grey. Thorax pale flesh-colour. Abdomen grey. Legs grey, posterior pair whitish. Forewings moderate, costa moderately arched, apex rounded, hindmargin almost straight, oblique; light rosy-pink; a moderately large irregular angular black spot somewhat before middle, resting on fold, margined posteriorly and beneath by a red line; a moderate blackish fascia from $\frac{2}{3}$ of costa to anal angle, sinuate inwards above middle, anteriorly suffused into fuscous, posteriorly sharply defined and somewhat whitish-edged; a patch on hindmargin beneath apex somewhat mixed with grey: cilia pale flesh-colour mixed with grey. Hindwings grey; cilia whitish-grey.

A very distinct species, intermediate between the two main groups of the genus.

George's Bay, Tasmania; one specimen in January.

HELIOCAUSTA, Meyr.

517. (36a.) *Hel. atæcha*, n. sp.

Minor, alis ant. saturate carneis, pallido-sparsis, punctis disci tribus serieque marginis postici perobscuris griseis; post. flavidis, ♀ partim griseo-mixtis, ciliis luteis.

♂ ♀. 16-18 mm. Head and thorax reddish-brown, strewn with whitish-ochreous. Palpi ochreous-whitish, rosy-tinged. Antennæ whitish, sharply annulated with dark fuscous. Abdomen whitish-yellowish. Legs yellow-whitish, anterior tibiæ and tarsi dull rosy. Forewings moderate, costa moderately arched, apex roundpointed, hindmargin straight, rather oblique; reddish-brown or deep flesh-colour, strewn with whitish-ochreous scales; markings formed by a few dark grey scales, very obscure; a dot in disc at $\frac{2}{5}$, a second rather beyond first on fold, and a third in disc at $\frac{2}{3}$; a small spot on costa at $\frac{1}{3}$, a second in middle, and a row of hardly distinguisable dots on apical third of costa and hindmargin: cilia pale rosy, towards tips whitish. Hindwings pale ochreous-yellowish, in ♀ somewhat mixed with grey before apex and towards dorsal margin; cilia pale ochreous-yellowish.

Nearest to *H. limbata*, which it closely resembles in the forewings, but immediately distinguished by the entire absence of the dark border to the hindwings, and the pale yellowish cilia.

Sydney, New South Wales; four specimens on a fence in October.

518. (43a.) *Hel. eudoxa*, n. sp.

Media, alis ant. griseo-luteis, puncto plicæ, altero disci maculam parvam superjacente, linea postica costam non attingente, striga marginis postici nebulosa in dorsum medium perducta saturatius fusco-purpureis; post. flavis, ciliis saturate griseis.

♂ ♀. 21-25 mm. Head bright yellow. Palpi whitish-ochreous. Antennæ fuscous. Thorax light greyish-ochreous, more or less suffused irregularly with dark fuscous-purplish except on patagia. Abdomen fuscous, margins yellowish. Legs whitish-ochreous, anterior and middle pair suffused with fuscous above. Forewings moderate, costa moderately arched, apex obtuse, hindmargin nearly straight, somewhat oblique, rounded beneath; greyish-yellowish or whitish-grey; costal edge pale yellowish; markings dull fuscous-purplish; a narrow obscure suffusion along inner margin from middle to anal angle; a dot on fold beneath middle, and a larger one in disc at ⅔; a small cloudy spot beneath second dot; a waved line from near hindmargin above middle to anal angle; a cloudy line along hindmargin dilating gradually to apex: cilia whitish, basal half rosy or purplish-tinged, towards anal angle and at apex greyish. Hindwings ochreous-yellow, basal hairs greyish; cilia dark grey, tips paler.

Closely allied to *H. paralyrgis* (of which I have now a series), but readily separated by the forewings being more or less greyish, not clear yellow-ochreous, and by the absence of the broad purple band which in *H. paralyrgis* extends along the hindmargin and posterior part of inner margin so as to absorb the other markings. Whether the species will remain as readily separable when forms from intermediate localities are known, is yet to be seen.

Larva stout, broadly flattened, broadest in middle; ochreous-whitish, towards sides slightly tinged with purplish-rosy; head dark brown; second segment blackish-fuscous, anterior margin ochreous-whitish; third and fourth segments with dark fuscous marks towards sides. Feeds on *Eucalyptus leucoxylon*, between a leaf and a piece cut from another leaf, forming an oblong slightly dilated chamber, in October. Pupa in a case formed of two oblong pieces of leaf joined by the edges, made by cutting out the larval habitation, and attached at each end by threads to the trunk; enclosed in a firm cocoon within the case. This larval habit is similar to that of *H. paralyrgis*.

Quorn, South Australia, in October and November; two specimens captured and a third bred.

519. (41a.) *Hel. epidesma*, n. sp.

Media, alis ant. flavis, basi, fascia post medium subconica, altera marginis postici supra latiore cum hac infra confluente saturatius cupreo-fuscis; post. saturatius cupreo-fuscis.

♀. 19 mm. Head ochreous-yellow. Palpi whitish-yellowish, second joint becoming fuscous towards base. Antennæ, thorax, abdomen, and legs dark fuscous; posterior tibiæ and apex of tarsal joints yellowish. Forewings moderately elongate, posteriorly somewhat dilated, costa gently arched, apex obtuse, hindmargin almost straight, rather oblique; ochreous-yellow; base narrowly coppery-fuscous; two rather dark coppery-fuscous fasciæ; first from costa beyond middle, rather narrow at first, dilating gradually throughout, on inner margin extending from middle to anal angle; second hindmarginal, rather broad on costa, gradually attenuated to anal angle, where it coalesces with first: cilia coppery-fuscous, terminal half grey-whitish. Hindwings rather dark coppery-fuscous; cilia as in forewings.

In general appearance intermediate between *Hel. hemiteles* and *Phil. bimaculana*, but recognisable by the form of the fasciæ.

Melbourne, Victoria; one specimen received from Dr. Lucas.

REMARKS ON AUSTRALIAN PTINIDÆ AND DESCRIPTIONS OF NEW GENERA AND SPECIES.

By A. Sidney Olliff, F.E.S.

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In this Paper I have drawn up descriptions of some new Australian species of Ptinidæ belonging to the subfamily in which the antennæ are inserted upon the front of the head. I have not attempted to make use of the tabular characters proposed by M. Boieldieu in his "Monographie des Ptiniores," as I find the Australian species of *Ptinus* do not permit of subdivision on colour and marking alone.

Ptinus exulans, Erich., is known to me from Jerrawa, Bowenfels, Sydney and Tasmania. It varies slightly in the size and shape of the white spots.

Ptinus fur, Linn.—I have seen specimens of this ubiquitous species from Melbourne and Tasmania.

Mezium affine, Boield. and *Gibbium scotias*, Fabr. have both been taken in the neighbourhood of Sydney, the former in some numbers, but they are undoubtedly introduced species.

Ectrephes formicarum, Pasc.—This species is known to range from Adelaide to West Australia. I have seen specimens from Gawler, Adelaide and Nichol Bay and it has been recorded from Freemantle.

All the following species, with the exception of *Ptinus adeps* and *P. imulus* which were kindly placed at my disposal by Mr. Masters, are in the collection of the Australian Museum.

PTINUS ADEPS, sp. n.

Ovate, rather broad, not very strongly convex, shining black, tinged with metallic green, moderately thickly clothed with long black pubescence; prothorax not very strongly constricted behind; elytra finely punctate-striate, with a moderately large transverse spot of white pubescence near the humeral angles and a narrow fascia behind the middle.

Head rather strongly produced in the middle, finely, irregularly and very closely punctured. Antennæ pitchy, finely pubescent. Prothorax slightly longer than broad, feebly constricted behind, strongly and not very closely punctured, the basal impression moderately deep. Scutellum small, rounded behind, finely pubescent. Elytra very feebly rounded at the sides, finely and closely punctate-striate, the interstices rather broad and impunctate. Underside and legs finely pubescent. Length 3-3½ mm.

Wide Bay, Queensland; Morpeth, Sydney, New South Wales.

This species and *Ptinus albomaculatus*, Macleay, from Gayndah, are very closely allied; the latter may be distinguished by its slightly larger size, blue-black colour and by its much more strongly punctured elytral striæ.

PTINUS EMINENS, sp. n.

Elongate-ovate, moderately convex, pitchy black, shining, densely clothed with rather long black pubescence; prothorax not very strongly constricted behind; elytra rather strongly and irregularly punctate-striate, with four large transverse patches of yellow pubescence, two near the humeral angles and one on each side behind the middle.

Head produced into a point between the antennæ, finely and closely punctured. Antennæ castaneous, clothed with fine grey pubescence. Prothorax slightly longer than broad, rather finely and closely punctured, deeply impressed at the base. Scutellum small, rounded behind, densely covered with grey pubescence. Elytra nearly parallel for two-thirds of their length, then arcuately rounded to the apex, rather strongly and irregularly punctate-striate, the interstices narrow and very finely rugose: each elytron with two patches of yellow pubescence, one near the humeral angle not much broader than long, the other behind the middle and strongly transverse, the first of these patches edged with grey pubescence externally. Underside and legs castaneous, densely clothed with grey pubescence. Length 2¾ mm.

King George's Sound, West Australia; four specimens found between the fronds of the grass tree (*Xanthorrhea.*)

A very distinct species, quite unlike anything known to me.

PTINUS ATTRITUS, sp. n.

Elongate-ovate, moderately convex, dark metallic brassy green; prothorax very densely clothed with long velvety dark brown pubescence except on the median line; elytra rather strongly punctate-striate, moderately thickly covered with long black pubescence: each elytron with a small tuft of yellow pubescence near the base, a broad indistinct patch of grey pubescence near the humeral angle extending hindwards towards the suture and a conspicuous yellow fascia behind the middle.

Head produced into a point between the eyes, finely and closely covered with grey and brownish yellow pubescence. Antennæ castaneous, clothed with grey pubescence. Prothorax longer than broad, rather abruptly constricted behind, finely and closely punctured, no distinct median line, the pubescence divided down the middle thus giving the prothorax a furrowed appearance. Scutellum small, rounded behind, finely pubescent. Elytra rather strongly punctate-striate, the interstices broad, impunctate: each elytron with a moderately broad oblique fascia behind the middle composed of yellow pubescence, bordered below with grey pubescence, a tuft of grey pubescence just beyond its extremity near the lateral margin. Legs pitchy, covered with grey pubescence. Length 2-2½ mm.

Port Lincoln, South Australia; King George's Sound, West Australia.

In its general outline and tufted upper surface this species seems to approach *Ptinus niveicollis,* Boield. from St. Domingo, but in every other respect it is widely different.

PTINUS IMULUS, sp. n.

Elongate-ovate, rather convex, pitchy black, somewhat shining; prothorax thickly clothed with black pubescence, two small indistinct patches of yellow pubescence at the base; elytra finely punctate-striate, an indistinct patch of grey pubescence near the humeral angles and a distinct transverse fascia considerably behind the middle composed of yellowish pubescence.

Head very feebly produced between the antennæ, very finely punctured and pubescent. Antennæ dark ferruginous, finely pubescent. Prothorax not very strongly constricted behind, very finely, irregularly and closely punctured. Elytra with the sides arcuately rounded, finely punctate-striate, the interstices moderately broad, impunctate. Legs ferruginous, finely pubescent. Length 2 mm.

King George's Sound, West Australia.

PTINUS EGENUS, sp. n.

Elongate-ovate, moderately convex, dark ferruginous, shining, moderately thickly covered with long yellow pubescence; prothorax with the sides somewhat thickened in the middle, not very strongly constricted behind; elytra moderately strongly striate-punctate, with a small patch of grey pubescence at the humeral angles.

Head very feebly produced between the antennæ, finely punctured and pubescent. Prothorax rather longer than broad, extremely finely and not very closely punctured on the disc, a few strong punctures along the anterior margin; the sides slightly thickened just before the constriction; basal impression rather deep. Scutellum small, rounded behind, finely pubescent. Elytra with the sides arcuately rounded, striate-punctate, the interstices rather broad, impunctate. Underside and legs dark ferruginous, very finely pubescent. Length 3 mm.

Lane Cove, Sydney, Bombala, Illawarra, New South Wales.

This species should be placed between *Ptinus tectus*, Boield. and *Ptinus exulans*, Erich. Its shining upper surface, finely punctured prothorax and much less closely striate-punctate elytra will serve to distinguish it.

PTINUS LONGUS, sp. n.

Elongate, narrow, moderately convex, pitchy black, shining, rather thickly clothed with long yellow pubescence; prothorax rather strongly constricted behind; elytra dark piceous, with the sides nearly parallel, distinctly punctate-striate, a yellow patch composed of short pubescence extending from behind the middle to just before the apex, ornamented on the anterior border and at the apex with grey pubescence, a small spot at the humeral angle and a common fascia near the base also composed of grey scales.

Head rather strongly, irregularly and closely punctured. Antennæ ferruginous, finely pubescent. Prothorax slightly longer than broad, moderately strongly rugose-punctate, rather abruptly constricted and strongly impressed behind. Scutellum small, rounded behind, finely pubescent. Elytra nearly parallel for two-thirds of their length, then arcuately rounded to the apex, finely but distinctly punctate-striate, the interstices moderately broad, impunctate. Underside and legs dark ferruginous, densely covered with grey pubescence. Length 3½ mm.

Wide Bay, Queensland.

My knowledge of this very distinct species is confined to a single male example.

DIPHOBIA, gen. nov.

Body elongate-ovate, convex. Head small, constricted on each side behind the antennæ. Eyes small, lateral. Antennæ eleven jointed, filiform, the basal joint considerably enlarged, the second about as long as the first but not enlarged, the following joints slightly decreasing in length towards the apex. Prothorax elongate, anterior margin slightly elevated, with a strong curved impression behind the middle terminating on each side at a point where the prothorax is rather strongly constricted. Elytra oval, with short elongate impressions at the base. Legs rather long; femora somewhat thickened; tibiæ unarmed; tarsi five jointed.

This genus connects *Diplocotes*, Westw. (Thes. Ent. Oxon, pl. 3, fig. 6) with *Ptinus*, but is sufficiently distinguished by its elongate and deeply impressed prothorax (which is narrowed and strongly constricted behind) and by its filiform eleven jointed antennæ.

DIPHOBIA FAMILIARIS, sp. n.

Elongate-ovate, strongly convex, pitchy black, somewhat shining. Head rather finely and closely punctured, with an indistinct median line; the anterior margin bisinuate. Antennæ clothed with short grey pubescence; first four joints finely rugose. Prothorax considerably longer than broad, slightly narrowed behind, sparingly clothed with short bristly grey hairs, distinctly striolate, the curved impression more strongly impressed in the middle than near the margins; the sides rounded in front, rather strongly constricted at the apical two-thirds. Elytra globose, impunctate, with indistinct traces of striæ, four moderately strong basal impressions; the suture feebly raised. Underside coloured as above; sterna moderately strongly and closely punctured; abdominal segments less strongly and sparingly punctured. Legs pitchy. Length 2½-3 mm.

South Australia. Under bark; apparently an abundant species.

Immature specimens have the elytra and legs of a reddish testaceous colour.

ENASIBA, gen. nov.

Body elongate, convex. Head transverse, constricted just in front of the eyes. Eyes small, lateral. Antennæ eleven jointed (?), (1) the basal joint longer than broad, the second about half as long as the first, obliquely truncated behind, the third narrower in front than behind, fourth to sixth joints similar to the third in shape, but considerably larger, seventh and eighth moniliform smaller than the preceding, ninth globose and enlarged, tenth smaller, slightly longer than broad. Prothorax elongate, anterior margin rounded, with a transverse slightly curved impression behind the middle terminating on each side at a point where the prothorax is rather strongly constricted. Elytra elongate-ovate, with large impressions at the base. Legs long; femora slender; tibiæ and tarsi unarmed, the latter five jointed.

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(1) The unique specimen upon which this genus is founded appears to have lost the terminal joint of each of its antennæ.

Allied to *Diphobia* and *Diplocotes*, but distinguished by its peculiar antennæ, narrower and more elongate prothorax (which is provided with a median line) and long slender legs.

ENASIBA TRISTIS, sp. n.

Elongate, strongly convex, dark piceous, shining, finely and not very closely pubescent. Head rather long, narrow, slightly emarginate in front, finely, irregularly and rather closely punctured, with a moderately strong transverse impression about the middle. Antennæ clothed with short grey pubescence, shining. Prothorax much longer than broad, slightly broader in front than behind, rather strongly and somewhat irregularly striolate; the sides feebly rounded in front, constricted at the apical two-thirds; a strongly impressed median line. Elytra elongate-ovate, very finely aciculate longitudinally and very finely striate-punctate, six rather large basal impressions. Underside coloured as above. Legs dark reddish testaceous. Length 4 mm.

King George's Sound, West Australia.

DIPLOCOTES FOVEICOLLIS, sp. n.

Elongate-ovate, strongly convex, castaneous, shining. Head rather finely and closely punctured; the anterior margin bisinuate. Antennæ clothed with fine grey pubescence, joints 2-9 moniliform. Prothorax much longer than broad, narrowed behind, moderately strongly striolate, the curved impression not very strongly marked, with a large circular fovea in the middle; the sides produced into an obtuse angle just before the middle, strongly constricted just behind the middle; posterior angles acute. Elytra pale castaneous, extremely finely pubescent, finely punctate-striate, the interstices narrow, with a few fine irregular punctures; the basal margin somewhat raised. Underside coloured as above. Legs pale castaneous. Length 2½ mm.

New South Wales.

Allied to the common South Australian *Diplocotes Howittanus*, Westw. (Thes. Ent. Oxon. pl. 3, fig. 6) but differs in having its strongly constricted prothorax provided with a deep fovea on the disc behind the middle and its elytra more ovate, rather less strongly punctate-striate and very finely pubescent.

NEW SPECIES OF LAND AND FRESH WATER MOLLUSCA FROM MACLAY-COAST AND TRITON BAY, NEW GUINEA, COLLECTED BY BARON MACLAY,

By J. Brazier, C.M.Z.S., &c., &c.

1. Helix (Geotrochus) Gorenduensis. Nov. sp.

Shell imperforated, trochus-shaped, rather thin, obliquely finely striated and transversely wrinkled, flesh-tinted a cream colour; ornamented with pinkish opaque spots and dots; spine rather conoid, whorls 5, convex the last more convex the first three apical whorls dark rose pink, the fourth a little lighter in colour, the fifth slightly keeled in front, cream coloured, and marked with opaque pinkish spots and dots; base convex, sculptured same as above; aperture triangular, very much produced and contracted in front, constricted behind the aperture, interior bright pink, peristome blackish purple, slightly reflected; the right margin descending in front; columellar margin flattened and expanded, tinged with brown, margins joined with a thin pink callous entering spirally into the interior of the aperture.

Diam., Maj. 25. Min. 20. Alt. 15 millim.

Hab.—Gorendu, Maclay-Coast, New Guinea, 1876.

Two specimens of this very pretty species were found by Baron Miklouho-Maclay. One was dead and weather-beaten, the other was found with the animal alive. The Baron informs me that the animal was black, and that the back of the neck was brown.

2. Helix (Geotrochus) Maclayiana. Nov. sp.

Shell covered with a thin yellowish brown epidermis, umbilicated, depressly conoid, rather solid, obliquely plicately striated, everywhere minutely malleated, encircled with numerous spiral broken purplish-chesnut lines and whitish opaque patches; spire somewhat obtuse; whorls 4½ moderately convex, the two apical whorls smooth, white, the last large, convex, descending in front; suture impressed having a narrow white line; below the suture blotches of purplish chesnut; base convex having four spiral purplish lines slightly broken up into blotches; aperture very oblique, large, ovate, interior purplish-brown; peristome thickened, white, reflected; margins approximating, the right rather thin at the upper part; columellar margin thickened, broadly expanded and reflected covering half of the umbilicus.

Diam. Maj. 39. Min. 30. Alt. 24 millim.

Hab —Maclay-Coast, New Guinea, 1876.

Only one specimen of this species was found. It has a thick solid white reflected lip 5 mm. broad, and the interior of an intense purplish chestnut. It also resembles, in its marking, *Helix Brazieræ*, Braz from Yule Island, and *Helix Taumantias*, Tapparone Canefri from the Fly and Katow Rivers, New Guinea.

3. HELIX (RHYSOTA) ACHILLES. Nov. sp.

Shell umbilicated, subdiscoid, granulose, obliquely striated, rather obtusely angled, depressed at the upper part, very light brown, slightly keeled at the periphery; whorls 5½ moderately convex, first 3½ finely granulated, the last two rugosely granulated, regularly increasing in size, the last very large; suture impressed deeper towards the last whorl, marked with a narrow broad chesnut line fading away as the apex is reached; base chestnut brown from the periphery, spirally granulose, the grains getting finer towards the umbilicus; umbilicus large deep; aperture angularly lunar, white within, peristome white, margins distant, the right rather thin, columellar margin regular, thickened and joined to the upper with a thick coating of callous on the body whorl.

Diam., Maj. 50. Min. 43. Alt. 26 millim

Hab.—Maclay Coast, New Guinea, 1876.

One specimen was found. This form is quite peculiar to New Guinea. The whole surface of the shell is granulated in a regular criss-cross way.

4. MELANIA WALLORIENSIS. Nov. sp.

Shell sharply subulate, narrow, whorls 11, flattish, longitudinally obliquely ribbed, ribs numerous and close together on the upper whorls, on the last 3 they are wider apart; suture deep; aperture oblong, ovate, peristome thin; columellar margin callously expanded.

Length 40: diameter 11: aperture 10 long, 6 wide, millim.

Hab.—The inland sea called Kamaka-Wallor 500 feet above sea level, Papua Kowiay on the N. W. Coast of New Guinea, Dutch Territory, Triton Bay; discovered by Baron N. de Miklouho-Maclay in 1874.

The single specimen is all bleached and weatherbeaten white. It resembles some of the subfossil species.

5. PALUDINA KOWIAYIENSIS. Nov. sp.

Shell ovately conical, narrowly and deeply umbilicated, very thin, fragile (generally covered with a lime deposit), light horny brown, sometimes spotted with opaque brown, sculptured with very fine oblique lines of growth and closely spirally linearly striated, striations rather wide apart, (only seen with the lens); whorls 5½, convex, the last roundly convex, (the spiral lines are more numerous and distant on the first 4½); apex acute; suture distinct; base with an obtuse keel round the umbilicus, aperture pyriformly circular; peristome thin, the margins connected with a thin callous deposit; interior brown.

Diam., Maj. 19. Min. 10. Alt. 21 millim.

Hab.—The inland sea called Kamaka-Wallor, 500 feet above sea level, Papua Kowiay on the N.W. coast of New Guinea, Dutch territory, Triton Bay; discovered by Baron de Miklouho-Maclay.

Two specimens found; one dead and worn, the other living, covered with a lime deposit. The operculum was not preserved with the specimen.

The other species collected by the Baron on the Maclay-Coast were *Helix* (*Chloritis*) *discordialis*, Fer., one specimen: *Neritina brevispina*, Lam., (the variety called by Sowerby *Neritina corona*, Linn., a blackish shell with three yellow spiral bands, one on the angle and two below), two specimens: *Neritina Touleyetana*, Recluz, two specimens: *Mitra cucumerina*, Lam., one specimen.

SECOND ADDENDUM

TO THE MONOGRAPH OF THE AUSTRALIAN SPONGES.

By R. von Lendenfeld, Ph.D.

Halme laxa. N. sp.

Shape and Size.

This sponge is similar to the digitate variety of *Halme nidus vesparum*, but it grows to a much larger size. The central bulbous mass measures 60 mm. in diameter, and is attached by a base about 40 mm. wide. From this 5-10 or more digitate processes grow upward. These attain a very much larger size in the variety *digitata* than in the variety *minima*. The whole sponge is, as the name implies, very loose in its structure. It is hollow throughout, the wall on an average 10 mm. thick. This wall is perforated by a great number of large holes which lie so close together that only narrow bridges of sponge tissue are left between them. The width of the meshes varies in the varieties. The average width however, is never less than 10 mm., whilst the thickness of the intervening walls does rarely exceed 1·5 mm. The shape of the meshes is more regular in fresh specimens than in dried ones, in consequence of the extreme laxity of the whole structure. Nevertheless, even in the fresh state, the meshes appear very much larger and more irregular than in any other species. They are of uniform shape throughout the whole body of the sponge.

Surface.

The surface is smooth, rendered slightly uneven in consequence of the irregular curvatures of the sponge lamellæ.

The oscula are small and circular, measuring about 1 mm. in diameter, pretty numerous and scattered irregularly over the surface. They are more numerous towards the interior than towards the outer surface.

COLOUR.

Alive very light pink, nearly white; in spirits this colour is retained. Dry skeletons are grey in consequence of the prevalence of sand.

CANAL SYSTEM.

A. VESTIBULE SPACE.

The vestibule space is developed as in *Halme tingens*, described in another paper of these Proceedings, and reminds one of Hippospongia. There is no dermal lamella at all. The lamellæ terminate distally with sharp margins. An interesting structure is the cavity which pervades the whole of the sponge. This has a width equal to a third of the diameter of the whole sponge. It must be considered as the first step towards the development of a pseudogaster, although it is divided from the outer water only by the loose network described above.

B. CANAL SYSTEM PROPER.

The subdermal cavities are very extensive, and the canals in the interior very large, many measuring 1 mm. in diameter. The ciliated chambers are very small and abundant.

SKELETON.

The network of horny fibres has very wide meshes; foreign bodies are not very abundant and form the core only of the main fibres. The main fibres have a thickness of 0.25 mm., the meshes an average width of 0.9 mm., and the connecting fibres which are free from foreign bodies, measure 0.012 mm. in thickness. The fibres are of a dark brown colour and consist of very uniform spongiolin, which does not show any indication of being stratified.

It is very remarkable that silicious spicules are found in great abundance in this sponge. Near the skin the main fibres form branches in a penicillate manner, and the branches are constituted nearly exclusively of spicules, which vary much in shape and size, but still I think it not unlikely that this sponge may belong to the silicious sponges, and that the spicules are not foreign bodies as I assume. The spicules in the surface are mostly slender and long, averaging 0.2 mm. in length and 0.003 mm. in thickness. In the interior numerous short and stout spicules are found together with slender ones such as those on the surface. These are Tr. Ac., and measure 0.08 x 0.007 mm., and are often inserted into the horny fibres as in the true Echispidæ. This species is one of those forms which, like certain species of Dactylochalina and Chalinopsis, are intermediate, between the horny and the silicious sponges.

I. VARIETY, HALME LAXA MINIMA.

Small and irregular, the digitate processes hardly longer than high, and the whole sponge flat and extended, more or less incrusting. The network of the sponge lamella is formed of lamellæ not more than 1 mm. thick, whilst the meshes barely exceed a width of 10 mm.

GEOGRAPHICAL DISTRIBUTION.

East Coast of Australia, Port Jackson, (von Lendenfeld.)

BATHYMETRICAL DISTRIBUTION,

30 metres.

II. VARIETY, HALME LAXA DIGITATA.

Grows to a large size, the digitate processes attaining a height of 300 mm., by a width of 70 mm. They are however, not so numerous as in the foregoing variety. The meshes of the network are much wider, averaging a diameter of 20 mm.

GEOGRAPHICAL DISTRIBUTION.

East Coast of Australia, Port Jackson, (von Lendenfeld.)

BATHYMETRICAL DISTRIBUTION.

Shallow water.

HALME GIGANTEA. N. sp.

SHAPE AND SIZE.

I distinguish three varieties of this species. These differ from each other, particularly in their outer shape and in the size of the meshes of the network of the sponge. The sponge consists of a basal mass, attaining a diameter of 100 mm., and attached by a broad base. From this, peculiar elongate more or less conic processes grow upward. These processes differ very much in their shape from the regularly cylindrical digitate processes of the foregoing species. Their greatest width is half-way up, from there they taper to a narrow point. They attain a length of 400 mm. and a greatest width in the centre of 60 mm. Very often three or more of these processes coalesce for a part of the distance to form thick lamellæ, which may attain a size of 150 by 120 mm. From the terminations of these lamellæ the distal parts of the conic processes project, so that the lamella itself attains a highly serrated margin, with 4 or 5 incisions not less than 80 mm. deep. Like the foregoing species, this one also is hollow. The cavity measures about $\frac{1}{3}$ of the diameter of the sponge. The sponge lamella itself forms a network with meshes which are much more regular and smaller than in the foregoing species. Their width varies as mentioned above in the different varieties, from 4 to 12 mm. The distal margin of the sponge lamella is slightly thickened and not sharp as in *Halme laxa*. There is, however, no trace of a dermal lamella. The meshes are more or less hexagonal.

SURFACE.

Smooth, slightly uneven.

COLOUR.

Light brown, skeletons yellowish-grey.

CANAL SYSTEM.

A. VESTIBULE CANALS.

The central continuous cavity is a primitive form of pseudogaster. The reticulation is pretty regular below the outer surface, where the lamellæ are always more or less vertical to the surface. Towards the interior however, they become slightly irregular. The straight prismatic spaces of the outer portion, lead into more oblique canals before they enter the pseudogaster.

B. CANAL SYSTEM PROPER.

The subdermal cavities are small and inconspicuous. The canals in the interior rarely exceed the width of 0.2 mm. This species therefore appears more dense than the foregoing.

SKELETON.

The skeleton of this species is similar to the foregoing.

I. VARIETY, HALME GIGANTEA MICROPORA.

With long and slender processes; the meshes of the network on an average 6 mm. in width.

GEOGRAPHICAL DISTRIBUTION.

East Coast of Australia, Illawarra, (Ramsay.)

BATHYMETRICAL DISTRIBUTION.

(?)

II. VARIETY, HALME GIGANTEA INTERMEDIA.

More irregular in shape, the digitate processes terminally more rounded; the pores or meshes of the network on an average 7-8 mm.

GEOGRAPHICAL DISTRIBUTION.

East Coast of Australia, (Ramsay); Broughton Islands.

BATHYMETRICAL DISTRIBUTION.

(?)

III. VARIETY, HALME GIGANTEA MACROPORA.

Similar to the foregoing but with pores or meshes of the sponge reticulation about 10 mm. wide. In this variety sometimes bulbous extensions in the processes are met with. With these, extensions of the pseudogaster correspond. In these swellings, moreover, the pseudogaster has a diameter equal to half that of the sponge.

GEOGRAPHICAL DISTRIBUTION.

East Coast of Australia, (Ramsay.)

BATHYMETRICAL DISTRIBUTION.

(?)

NOTES FROM THE AUSTRALIAN MUSEUM.

DESCRIPTION OF A NEW CORIS.

BY

E. P. RAMSAY, F.R.S.E., AND J. DOUGLAS-OGILBY.

CORIS REX. sp. nov.

D. 9/12; A. 3/12; V. 1/5; P. 13; C. 14; L. lat. 98; L. trans. 11/38.

Length of head $4\frac{1}{5}$, height of body $3\frac{9}{10}$ in the total length. *Eyes*—small, diameter $\frac{1}{7}$ of the length of head, $\frac{2}{5}$ of that of snout, and $\frac{5}{8}$ of the convex interorbital space. Upper jaw rather the longer; the maxilla extends to the vertical from the posterior nostril. *Teeth*—in both jaws in a double series, the inner of which is minute; a pair of strong canines in front of either jaw, those of the lower jaw fitting between the upper ones when the mouth is closed; the upper jaw has a strong curved tooth behind each anterior canine; about ten lateral teeth on each ramus; these decrease in size gradually from the front; a pair of posterior canines at each angle of the mouth. *Fins*—The dorsal commences midway between the base of the pectoral and the hind limb of the preopercle; its spines are moderately strong, subequal in length, as long as the snout: the anal commences opposite the soft dorsal; its third spine is longest, not nearly so long as the last dorsal spine: pectorals well developed, equal to the distance between the front margin of the eye and the point of the opercular flap: outer ventral ray elongate, rather longer than the pectorals, and reaching to the vent: caudal slightly rounded. *Lateral line*—curved beneath the ninth and tenth dorsal rays; its tubules simple. *Colors*—reddish-brown, inclining to salmon-color below; a broad purplish-brown band between the seventh and eighth dorsal spines and the anus; this is margined on either side by a narrower greyish band, the anterior of which partly surrounds an oblong vertical gamboge-yellow patch, which lies immediately behind and beneath the posterior margin of the pectoral fin; the lower limb of the preopercle, the interopercle, and the head above the eye are pale sea-green; lips, cheeks, hinder limb of preopercle, and the opercle pale red, except the opercular flap, which is blue: posterior half of the body ornamented with twelve narrow whitish M-shaped vertical streaks, the central part, which occupies the greater portion of the height, being semicircular with the convexity forward. Dorsal blue with a narrow pale basal band; anal and caudal fins bluish with pale blotches at the base and an irregular reddish median line: pectorals bright red at the base, opalescent in the middle, and broadly tipped and margined with deep blue: ventrals immaculate.

This magnificent fish was taken on the 13th instant, by Mr. G. Billington off Bondi Heads. It measures 16·50 inches, and is in fine condition, but shows no signs of breeding. Its stomach contained numerous remains of crustaceans and molluscs, all considerably broken up; among the latter Mr. Brazier has identified *Urosalpinx tritoniformis*, *Mitra badia*, *Gibbula strangei*, and a species each of *Natica* and *Clanculus*. The specimen has been presented by its captor to the Australian Museum, where its registered number is B. 9902.

NOTES AND EXHIBITS.

Mr. Ogilby exhibited a specimen of the fish *Coris rex.*

Mr. Brazier exhibited the shells from the Maclay-Coast described in his paper.

Baron Maclay exhibited a fragment of Jet from New Guinea, which had been found by Mr. Wilkinson to possess a specific gravity of 1·24, and was presumed by him, mainly on the ground of its resemblance to Jet of this country, to indicate, probably, the existence of coal. Baron Maclay added that, as far as he knew, the first discovery of coal in New Guinea was mentioned in the report of Van Delden as far back as 1828. Further details about the same coal on the small Island Lakahia, on the N.W. coast of New Guinea, are to be found in the account of the expedition of the Dutch Government steamer "Etna" in 1858, edited by the Royal Institute in 1862 (on page 131-143). The opinion of the scientific commission of the "Etna" is that the coal on the island Lakahia belongs to a *recent* formation, and is a "lamellated" ("bladerige") coal.

Mr. Prince exhibited a large number of Volutes, differing very considerably in general appearance, but all belonging to *V. piperita,* though including the supposed species *V. Ruckeri*, *V. Macgillivrayi*, *V. Cathcarti*, and *V. Rutilla.*

Dr. Cox exhibited specimens sent from the Hunter by Mr. J. S. Skeat, including teeth and bones of horses from deep alluvium; and from the Upper Carboniferous near Maitland, representatives of the following genera:—*Spirifer*, *Pleurotomaria*, *Productus*, *Aviculopecten*, *Bellerophon*, *Sanguivolites*. The beds from which these fossils were obtained overlie the West Maitland Coal Seams. Also excellent casts of fishes taken in gelatine, and coloured after life. Also a very splendid example of the flower and fruit of *Eucalyptus ficifolia*, of West Australia.

Mr. Masters exhibited some Moths, apparently Pyralidæ, bred from caterpillars found feeding on a *Coccus* which infested the common *Zamia*. The caterpillars in the course of a few days, completely cleared the plant of the scale, devouring the *Coccus* and forming with the scales or empty skins, complete coverings for themselves, which they carried about on their backs. They fed at night, and during the day fixed themselves securely to the mid-rib of the frond.

Mr. Whitelegge exhibited living specimens of *Cordylophora*, a fresh water Hydroid Zoophyte, from Parramatta. Also, some very beautifully mounted specimens of the same under the microscope. Dr. Lendenfeld expressed his belief that this exhibit was probably a new form.

Mr. Macleay exhibited a remarkably fine specimen of *Eunice* sp? taken in Sydney Harbour by James Hill, Esq., of Vaucluse.

ANNUAL GENERAL MEETING.

27TH JANUARY, 1886.

The President, Professor W. J. Stephens, M.A., in the Chair.

PRESIDENT'S ADDRESS.

At the end of the Eleventh Year of the Society's operations, it becomes my duty, as President, to lay before you a general account of our proceedings during the last twelve months, and to invite you to take a momentary retrospect over the ground which has been traversed since our course commenced.

First, however, I have to discharge the melancholy obligation of recalling to your minds the memory of those members who have passed away from among us since our last annual reunion.

Mr. Robert Archibald Alison Morehead died on Friday, January 9, at the age of 72 years. Throughout his whole residence in New South Wales he had taken a warm interest in the question of popular education, was a Member of the National Board, and of the Council of Education after the Legislation of 1866, and was a Trustee of the Sydney Grammar School from its foundation. He was, let me add, one of the original Members or founders of this Society.

Mr. William Augustine Duncan, C.M.G., died on Thursday, June 25, in his 75th year. His literary faculty was fertile and of a high order, and the exercise of his powers was directed by a pure and sincere conscientiousness. Like Mr. Morehead, he was a Member of the National Board, and afterwards of the

Council of Education. He was a Trustee of the Free Public Library from the first, and, on the resignation of Dr. Badham, was elected Chairman of the Board. Like Mr. Morehead he was one of the original Members of this Society. He had collected a very valuable and extensive library, in which almost every book had some peculiar characteristic or interest of its own.

Mr. David Henry Campbell died at his residence, Cunningham Plains, on Sunday, August 23, aged 55 years. Outside his large circle of friends he was principally known by the action in which he distinguished himself during the outbreak of bushranging about 20 years ago, when in a spirited defence of his house at Goimbla against an attack of the Gilbert and Ben Hall gang, he shot dead one of their number, the bushranger O'Meally.

The only legislative changes which have taken place in the Constitution of the Society are the following:—(1.) The entrance fee for new members has been abolished, and the Annual Subscription raised to Two Guineas, in consideration of the very largely increased advantages which are now placed at the disposal of members; and (2) Ladies may be admitted by election as Associates of the Society for an Annual Subscription of One Guinea, with all privileges in the way of study, use of library, laboratory, &c., except the right to attend the Monthly Meetings of the Society. This enlargement of the Society's sphere is admittedly only tentative, and may probably be increased hereafter by the admission of all members to full rights without distinction of sex, following the improved practice of the Sydney University in this respect.

But a great alteration in the accommodation provided for the use of the Society presents itself to our eyes, in this spacious house which has been presented to us by Mr. Macleay. In the course of 1884 an Act of Parliament was, as you all are aware, obtained for the Incorporation of the Society, mainly through the good offices of the Hon. W. B. Dalley, M.L.C. Although thus raised to a position of permanence and dignity, we had nevertheless no certain abode of our own, but lived under shelter of a roof found for us by the liberality of Mr. Macleay. These quarters, though convenient and comfortable enough, were unfortunately situated upon the noisiest portion of the Tramway, the vicinity of which is as disadvantageous for study as its accommodation is serviceable to general traffic. Finally therefore Mr. Macleay carried his course of benefaction to the Society a long stage further, by building for us upon his own land an excellently planned and commodious Home, containing a hall, with library attached, in which our meetings are now held, a spacious laboratory, and two large rooms for committees and other purposes. How roomy, airy and light this abode of Science is, and how pleasant its surroundings, all who are now present, or were Mr. Macleay's guests on the day when he made over this noble donation for the benefit of generations to come, can readily testify. Of that day an account has been prepared which will serve as a slight record of his unceasing effort for the good of the Society, and of our hearty and serious appreciation of his generosity. It is my pleasing duty to add that Mr. Macleay has consented to have a portrait of himself taken in marble, which shall be placed in this hall as a conspicuous and enduring memorial of our sincere and frank gratitude.

There are one or two epochs in our brief history which may fairly claim our consideration for a moment, exhibiting as they do the extraordinary growth which has been made since the days of our infancy and cradlehood. Only yesterday we celebrated the birthday of the Australian Nation, and honoured with pardonable exultation the vigorous adolescence of this Britain of the Pacific, for which we discern in her early achievements an earnest of a future, not only of domestic prosperity, but also, and more emphatically, of Imperial significance, attended with results which will influence widely and deeply the ages that are to come, and forward the long-hoped-for and long-delayed approach of the commonwealth of humanity. To-day our theme is humbler. Yet this Society also shares in the development of the greater Society in which its roots are implanted, out of whose natural fertility it draws its vital strength, and to which in due course it returns all that it has received, with increase untold. Our progress depends essentially upon the prosperity of the people, and that prosperity cannot but derive continued expansion and progressive enrichment from the advance of Science in Australia.

Now the first Monthly Meeting of the Society was held Monday, January 25, 1875, under the Presidency of Mr. Macleay, who at the commencement of Autumn (May 18) set sail in the *Chevert* for New Guinea. On the return of that Expedition, Mr. Macleay resumed his chair at the next meeting, November 25, and read a paper containing a general account of his doings and collections on the voyage and in New Guinea. It may reasonably be said that this date marks the first epoch in our history. The quantity of new and interesting material then thrown down, at the feet and before the eyes of the Society, had, as might have been expected, a wonderfully quickening effect upon its previously rather sluggish energies; and so the voyage of the *Chevert* became the primary and material cause of its subsequent health and vitality. For at this very Meeting the President, while sketching out the distribution of his collections for the purpose of scientific examination, found himself compelled to admit "that he could not think of any one who was likely to do justice to the collections of the crustacea, echinodermata, annelida, polyzoa, polypifera, and other still lower forms of animal life." Such a sorrowful confession is not, we trust, likely to be again provoked. Many Members of the Society have shown themselves well qualified to deal with these subjects, and do deal with them accordingly. But indeed it was impossible to attempt so decided an advance into a strange country without the auxiliary force of books, in which we might find the observations of previous investigators recorded, their errors corrected, and their real discoveries confirmed. This assistance was for a long time out of the reach of Australian Naturalists, and it therefore became a habitual practice to refer every new object to persons resident in older countries, who, besides their own knowledge, had at hand the science of the whole world recorded in an accessible and convenient form. Now, however, the circumstances are to a large extent altered. The excellent Collections of the Australian Museum, the Free Public Library, the Royal Society, and (though as yet to a limited extent) of the Sydney University, as well as—though last, not least—of the Linnean Society, have given New South Wales a fair chance in the field. It may be observed, by the way, that concerted action on the part of these institutions might under present circumstances result in filling the inevitable blanks which even their united resources still disclose to the critical inquirer. But in any case it cannot but be a ground for lively satisfaction that the collections which have been made in the late Expedition to New Guinea, organized by the Geographical Society of Australasia, are to be examined, classified, and described by local authorities.

It is understood that the Mammalia, Birds, and Reptiles will be undertaken by Mr. Ramsay, the Fishes by Mr. Ogilby, the Insects by Mr. Macleay, the Crustacea by Mr. Haswell, the Mollusca by Mr. Brazier, the Cœlenterata, if possible, by Dr. v. Lendenfeld, and the Flora in general, as a matter of course, by the indefatigable Baron von Mueller. Some other branches have, I believe, not yet been allotted, but will, I do not doubt, be entrusted to Australian experts.

It is not necessary to occupy your time with a mere list of the various papers which have been read before the Society in the course of the last year, since that information will be published in a more convenient form in the Annual Volume of our Proceedings. But it may possibly conduce to a useful economy of time and trouble in hunting up the bibliography of any of our subjects, if I lay before you a short sketch, entering into no more detail than is absolutely requisite, of the work which has been accomplished during the past year in our own Society, and during the preceding one in the other Scientific Societies of Australia. I regret that it is not now, nor is it ever likely to be possible, that we at our Annual Meeting should review the whole contemporaneous territory from one panoramic centre. This could only be done by taking newspaper accounts of meetings and of papers as authoritative records, an assumption which might indeed be generally safe, but would also sometimes, for certain, lead the incautious reader into a maze of confusion and contradiction.

In the plan which I follow, I have adopted the order of succession as brought out by the date of each author's first paper during the year, and without any reference to the relative number, length or value of his contributions. It might, I admit, very naturally be urged that a classification by subjects would be more convenient and useful for reference. But it is found that many practical difficulties lie in the way of this procedure, and I have therefore been induced to prefer the arrangement according to authors' names, which in this case, as in that of libraries also, seems to present fewer incongruities and puzzles than any other.

Dr. von Lendenfeld has continued his Monograph of the Australian Sponges, commenced in 1884. Of the previous portion, Part I. (Vol. IX. p. 121) contains a general introduction, Historical and Bibliographical, to the subject ; Part II. (ib. p. 310) an account of the Morphology and Anatomy of Sponges in the widest sense ; and Part III. (ib. p. 1,083) deals with the Calcispongiæ. Other papers connected with the study of their organisms will be found at pages 434, 493, 495, 641, 896, 977. In January, 1885, he read Part IV. (p. 3. pl. IV.) upon the Myxospongiæ ; Part V. (p. 282, pl. XXVI-XXXV), commences the Ceraospongiæ, which are continued (to *Euspongia*) in Part VI. (p. 481, pl. XXXVI-XXXVIII.) Other papers upon the Sponges occur as follows : On the Phoriospongiæ, p. 81 ; On Carter's Australian Sponges, p. 151 ; On a Sponge Destructive to the Oysters in the Clarence River, p. 326 ; Addendum, No. I. to Monograph, p. 475 ; Notes on Sponges *Dendrilla*, *Raphyrus*, *Halme*, *&c.*, in the Australian Museum, p. 557, pl. XXXIX-XLIV. ; On a Vegetable Pseudomorph of a Siliceous Sponge, p. 726, pl. XLVIII. 5. ; Addendum No. 2 to Monograph, p. 845.

It will be observed that there are still wanting, to complete this important Monograph, the history of several families of the Horny Sponges, and of the Orders Monacticeræ, Hyalospongiæ and Monactihyalæ. (See vol. IX., p. 340). In view of the author's proposed migration to London the prospect of completion appears more remote than might have been desired. But I am given to understand that arrangements have been made for the continuation of the work outside of Australia, and since the subject covers a vast and unexpected extent of new ground, and cannot possibly be placed in more competent hands, it is to be earnestly hoped that no avoidable delay may defer its early execution.

Dr. von Lendenfeld has also appended to his previous work on the Australian Hydromedusæ a third Addendum (p. 477) with an amended classification, and a fourth (p. 679) on a new species of *Hydra;* together with a note on *Gorgonia rosacea*, Esch. (*Liriope* sp. Gegenb. &c.)

He has also continued his enquiries into the (supposed) Glacial Period in the Southern Hemisphere; and on the tokens of Glaciation which he had himself observed on the plateau of Mount Kosciusko (pp. 44, 330, pl. VII. VIII. See also Vol. IX., p. 806, On the time of the Glacial Period in N.Z.) His views on this subject have been vigorously combatted by Capt. F. W. Hutton, in a paper on the supposed Glacial period in Australia, p. 334. He has also contributed short papers on Section Cutting, p. 23; on *Amœba parasitica*, a protozoan infesting Sheep, p. 35, pl. VI. The Australian fresh water Rhizopoda, p. 723. Meteorology of Mount Kosciusko, p. 39; on Flight, p. 73; On Recent Changes in the Forest Flora of N.S.W., p. 721, and, in conjunction with Mr. Brazier, on *Onchidium chamæleon*, and the structure of the Dorsal skin in *Onchidium*, p. 730.

The Rev. W. Woolls, Ph.D., F.L.S., &c., has written upon the Geographical distribution and economic uses of the Proteaceæ of Australia (p. 54) pointing out the occurrence of existing genera, as *Banksia*, *Hakea*, *Grevillea*, in the Tertiary Beds of Northern Europe, and the present limitation of all those with dehiscent fruits to Africa and Australia, though no species is common to the two regions. West Australia counts 15 genera of 389 species, while New South Wales has 17 genera of only 124 species. Queensland has 59 species, Victoria 51, South Australia 33, North

Australia 33, and Tasmania 23 He has also a paper upon the occurrence of Double-Flowers in a wild state (p. 445). *Rubus rosifolius*, *Epacris purpurascens*, *E. microphylla*, *E. impressa*, *Sprengelia incarnata*, and *Astroloma humifusa;* several sp. of *Ranunculus; Eriostemon obovalis*, and *(?) Boronia pinnata: Convolvulus erubescens*; and *Wahlenbergia gracilis* have all been found doubled. The author is inclined to attribute this phenomenon, at least in part, to the agency of insects.

The Hon. W. Macleay, M.L.C., F.L.S., &c., writes—On 5 new Fishes, *Oligorus gibbiceps*, *Murrayia Jenkinsii*, *Galaxias* sp. and *Gadopsis* sp. from the Upper Murrumbidgee, p. 267. On *Ctenodax Wilkinsoni*, a new genus represented by a single specimen from Lord Howe Island, not referable to any recognised family, p. 718, pl. XLVII. Also, in conjunction with N. de M. Maclay, the Plagiostomata of the Pacific, No. III., with descriptions of *Heterodontus zebra*, *Myliobatis punctatus*, and *Discobatis marginatus*, p. 673, pl. XLV & XLVI, On a New Snake, *Furina Ramsayi*, from the Barrier Ranges, p. 61. On some New Reptiles, *Hinulia picta*, *Tetradactylus guttulatus*, *Nardoa crassa*, *Tropidonotus ater*, and *Hoplocephalus assimilis*, from the Herbert River, Queensland, p. 64. Also, Revision of genus *Lamprima* Latreille with descriptions of new species, p. 129. New Australian *Lucanidæ*, *Homolamprima* n. g. *Rhyssonotus* n. sp., and *Phalacrognathus* n.g., pp. 199, 473.

Mr. A. Sidney Olliff, F.E.S., Assistant Zoologist Australian Museum, contributes: Correction of Classification of certain Ceylonese *Clavicornia*, belonging to the *Nitidulidæ*, *Trogositidæ*, *Cucujidæ*, *Lathridiidæ*, and *Dermestidæ*, p. 69. *Cucujidæ* of Australia, p. 203. New species of *Carabidæ* and *Rhysodidæ*, p. 467. *Trogositidæ* of Australia, p. 699. New species and genera of Australian *Ptinidæ*, p. 833. A new Butterfly, belonging to the Lycænidæ, p. 716.

Mr. F. Ratte, Eng. Arts et Manuf., Paris. On a Devonian fossil from the Murrumbidgee Limestones, allied to *Worthenia* De Koninck, p. 79, pl. IX. On an uncommon form of Crystallisation in Siderite, p. 759, pl. LVI.

Mr. Brazier, C.M.Z.S., Synonymy of some Marine Shells described by Gray, viz.: *Strombus Australis*, *Bulla Australis* and *Bullina lineata*, p. 85. New species of Land and Freshwater Mollusca from Maclay Coast and Triton Bay, N. Guinea, p. 841; and, in conjunction with Dr. von Lendenfeld, as mentioned above, on *Onchidium chamæleon*, p. 729.

Mr. W. A. Haswell, M.A., B.Sc., &c. Notes on Australian *Amphipoda* (p. 95, pl. X.—XVIII.), including the genera *Talitrus*, *Allorchestes*, *Neobule*, *Aspidophoreia*, *Stegocephalus* *Ampelisca*, *Lysianassa (Anonyx)*, *Eusirus*, *Leucothea*, *Atylus*, *Dexamine*, *Megamæra*, *Mæra*, *Xenocheira*, *Haplocheira*, *Harmonia*. *Cyrtophium*, *Dexiocerella*, *Læmatophilus*, and *Proto*. Also (p. 273) a Series of Jottings from the Biological Laboratory of Sydney University. 1. On *Polydora (Leucodore) polybranchia*, in conjunction with *P. ciliata*, which is a mischievous parasite upon Oysters in the Hunter River. 2. On staining with Hæmatoxylin, and on embedding in Paraffin for histological purposes. 3. The minute structure of *Polynoë*. Also, 4. (p. 331.) On an Australian species of *Bonnellia*; and 5. Aquatic Respiration (?) in Freshwater Tortoises. Also a paper on some Australian Polychæta of the genera *Syllis*, *Gnathosyllis*, *Eulalia*, *Siphonostoma*. *Halla*, and *Staurocephalus*, p. 733, pl. L-LV.

Captain F. W. Hutton, F.G.S., &c.—A Revision of the Toxoglossate Mollusca of New Zealand, *Pleurotoma*, *Drillia*, *Mangilla* (?), *Clathurella*, *Daphnella*, and *Terebra*, p. 115. Also a paper, referred to before, on the supposed Glacial Period in Australia, p. 334, in which he criticises Dr. v. Lendenfeld's arguments upon the same subject.

Mr. J. Douglas-Ogilby, Assistant Zoologist, Australian Museum—Notes on some rare Port Jackson Fishes, viz., *Plectropoma nigro-rubrum*, Cuv. et Val., *Callionymus calcaratus*, Macl., *Ammotretis Macleayi*, and *Exocœtus melanocercus*, p. 119; New Fishes from Port Jackson, viz., *Petraites* gen. nov., sp., *heptæolus*, *Platycephalus macrodon*, *Percis Novæ Cambriæ*, and *Latris Ramsayi*, p. 225. *Neoanthias Guntheri*, p. 231. A new *Diplocrepis*, from Port Jackson, p. 270. Three new Fishes from

Port Jackson, viz., *Scyllium anale*, *Heliastes immaculatus* and *Pempheris lineatus*, p. 445. Distribution of some Australian Sharks and Rays, viz., *Carcharias crenidens*, *Scyllium anale*, *S. maculatum*, *Chiloscyllium ocellatum*, *Rhinobatus Bougainvillei*, *R. Djeddensis*, *Tœniura Lymma*, *Pteroplatea Australis*, and *Aëtobatis Narinari*, p. 463. On the Genus *Trachichthys*, p. 580. And, in conjunction with Mr. Ramsay, descriptions of new or rare Australian Fishes, viz., *Pteroplatea Australis*, n. sp., *Sebastes scaber*, n. sp., *Platycephalus arenarius*, n. sp., and *Cirrhitichthys graphidopterus*, and *Lepidotrigla pleuracanthica*, species previously known, p. 575. Two new Fishes from Port Jackson, *Seriola simplex* and *Nannocampus ruber*, p. 757, *Coris rex*, n. sp., p. 851.

N. de Miklouho-Maclay contributes a Second paper on the Zoology of the Maclay Coast, New Guinea, containing a description of *Macropus Tibol*, n. sp., p. 141, pl. XIX. On two new species of *Dorcopsis*, from N. Guinea, p. 145, pl. XX. On the Brain of *Halicore Australis*, p. 193, pl. XXIV. Plants used by natives of the Maclay Coast, cultivated and wild, with notes by Baron F. v. Müller, p. 346. Second Note on *Macrodontism*, referring the apparent enlargement of the teeth to the accumulation of a special kind of tartar, p. 682, pl, XLIX, The *Kéu* of the Maclay Coast, a sp. of *Piper*, closely allied to *P. methysticum*, Kava or Ava, p. 687 ; and, as already mentioned, in conjunction with Mr. Macleay, The Plagiostomata of the Pacific, No. III., p. 673.

Mr. A. G. Hamilton contributes a paper on the Fertilisation of *Goodenia hederacea*, in which, referring to Mr. Haviland's Notes on *Goodenia*, Vol IX., p. 449, he gives his reasons for concluding that the plant is self-fertilised, p. 157, pl. XXI. This conclusion is controverted by Mr. Haviland in a subsequent paper, p. 237.

Mr. K. H. Bennett: Notes on the habits of *Falco subniger*, *Glareola grallaria*, p. 162. Remarks upon the destruction of *Eucalyptus rostrata* and *E. mellidora* by Phalangers ('Possums), p. 453.

The Rev. J. Milne Curran, F.G.S., gives an account of the Geology of Dubbo, with special reference to the Mesozoic Carboniferous Beds. He regards the succession in the descending scale as follows:—1 Hawkesbury, 2 Clarence, 3 Ballinore, 4 Newcastle Upper Coal Measures, p. 170, pl. XXII. XXIII. Also, Notes on the Geology and Subterranean Water Supply of the North-western Interior, p. 233, pl. XXV., in which he deals especially with the underground courses and waters of the Macquarie River.

Baron von Mueller, K.C.M.G., &c., &c., records the occurrence of a remarkable *Haloragis (H. monosperma)* from New South Wales, and gives a list of plants which have been recently traced far to the South of their previously known range in New South Wales, p. 197. He also contributes a short paper on Edible Fruits from the Maclay Coast, N. Guinea, p. 355.

Mr. George Masters commences a new and complete Catalogue of Australian Coleoptera. Part I., containing the *Cicindelidæ*, and *Carabidæ*, p. 359; part II., including the *Dytiscidæ*, *Gyrinidæ*, *Staphylinidæ*, *Pselaphidæ* *Paussidæ*, *Scydmænidæ*, *Silphidæ*, *Trichopterygidæ*, *Scaphididæ*, *Histeridæ*, *Phalacridæ*, *Nitidulidæ*, *Trogositidæ*, *Colydidæ*, *Rhysodidæ*, *Cucujidæ*, *Cryptophagidæ*, *Latridiidæ*. *Mycetophagidæ*, *Dermestidæ*, *Byrrhidæ*, *Georyssidæ*, *Parnidæ*, and *Heteroceridæ*, 970 species, p. 583.

Mr. E. Haviland, F.L.S., discusses the Fertilisation of the Genus *Goodenia*, as has been already mentioned, p. 237, and continues his Notes on Plants Indigenous near Sydney, p. 458. In this part, No. 9, he examines the pollination of *Lyonsia reticulata* (Apocynaceæ), and arrives at the conclusion that this plant is closely self-fertilised.

Mr. E. P. Ramsay, F.R.S.E., &c., Curator of the Australian Museum, decribes Birds from Mount Astrolabe, New Guinea, p. 243, and a new species of *Colluricincla*, *C. Boweri*, from Cairns, Queensland, p. 244, and in conjunction with Mr. Douglas-Ogilby, as mentioned before, several new species of fishes, pp. 575, 757, 851.

Mr. Gervase F. Mathew, R.N., &c., contributes Notes on the Natural History of the Claremont Islands, p. 251, and An Afternoon among the Butterflies of Thursday Island, p. 259.

Mr. E. Meyrick, B.A., F.E.S., continues his Descriptions of Australian Microlepidoptera, p. 765.

The Eighteenth Yearly Volume of the Journal and Proceedings of the Royal Society of New South Wales, for 1884, is the last as yet published. From it we learn that the usual Address was delivered at the commencement of the Session, May 7, 1884, by the President, the late Professor Smith, C.M.G., M.L.C., &c.

After a brief relation of the scientific labours of M. Pasteur, then recently elected an Honorary Member of the Royal Society of N.S.W., in the room of Charles Darwin, he passed to a description of his recent visit to Europe, in which he gave a general account of Dr. Dohrn's zoological station at Naples, of Vesuvius, and of various European Universities, of electric lighting in England, of apparatus acquired by him for the Sydney University, and at greater length on the red sunsets and the eruption of Krakatoa, which he did not consider to be the cause of these phenomena.

Mr. W. Shellshear, Assoc. M. Inst. C. read (June 4) a paper on the Improvement of the Bar Harbours and River Entrances of the Coast of N.S.W., illustrated by 6 maps, p. 25.

Dr. A. Leibius, M.A., F.C.S., read (July 2) a paper on (1) The Gold of Mount Morgan, and improved methods of extraction from its ferruginous matrix; (2) The Preparation of Fine Gold; and (3) on the volatilisation of gold in the furnaces of the Sydney Mint, p. 37.

Professor Liversidge, F.R.S., read on the same day a paper on Native and Crystalline Gold; Tourmaline from Uralla; Scheelite from Hillgrove; Axinite, Idocrase, and Chrome Iron from Nundle; Concretion of Iron Pyrites from Sunny Corner, with partings of silica, &c., &c., p. 43.

The Rev. P. Macpherson, M.A., also on the same day, described the Blackfellow's Ovens, or Kitchen Middings, near Meredith, between Geelong and Ballarat, with speculations on their antiquity, and the density of the population which was in occupation of that district at the time of their formation, p. 49.

Mr. Lawrence Hargrave (August 6) read a paper upon "The Trochoided Plane," defined as a flat surface, the centre of which moves at uniform speed in a circle, the plane being normal to the surface of a Trochoidal Wave, having a period equal to one revolution of the said centre. In this arrangement he finds the key to the flight of birds, and the construction of flying machines, p. 61.

Mr. H. C. Russell, B.A., F.R.A.S., describes (Nov. 5) a new form of actinometer, depending on the conversion of water into steam by solar heat, p. 73. Also (Dec 17.), on a new self-registering Anemometer and Pluviometer for the Sydney Observatory, p. 118.

Mr. D. A. Porter, of Tamworth, read a paper (November 5) on Varieties and Localities in New South Wales of Quartz, Tourmaline, Topaz, Corundum, Beryl, Diamond, Idocrase. Axinite, and Wolfram, p. 75.

Mr. C. Moore, F.L.S., Director of the Botanic Garden, read (December 3) Notes on the Genus *Doryanthes* (Giant Lily), with an account of *D. Excelsa*, *D. Palmeri* and a new species *D. Larkini*, p. 81.

Mr. W. E. Abbott, of Abbottsford, Wingen, contributes (December 3) a long, elaborate, and highly interesting paper on The Water Supply in the Interior, in which, among other matters, he discusses the Geological Formation of the Plains, which he ascribes to the ancient existence of Salt or Bitter Lakes, comparable to the Caspian, and explains the modes in which water may be advantageously obtained or preserved in various districts, p. 85.

Mr. W. H. Caldwell, M. A., Balfour-Student in the University, and Fellow of Gonville and Caius' College, Cambridge, gave (December 17) an extempore account of his work in ascertaining the mode of development of the embryos of Marsupials, Monotremes, and the Ceratodus. He gave a description of the

Marsupial Ovum, of the Eggs, in the proper sense of the word, with large yolk, of the Monotremes, and of the quasi Amphibian Structure and Embryology of *Ceratodus*, p. 117.

[NOTE.—By the kindness of Mr. Webb, Secretary to the Society, I am enabled to add that during the session of 1885, the reports of which are not yet published by authority, the Presidential Address was delivered by Mr. H. C. Russell, B.A., F.R.A.S., &c., (*S.M.H.* May 7), who also wrote on Local Variations of the Earth's Surface (*S.M.H.*, July 2); and on a new form of Anemometer (*S.M H.* December 3.) Mr. Hargraves continued his Notes on Flying Machines (*S.M.H.* June 4 and December 3). Mr. G. H. Knibbs discussed a system of accurate measurement, by Steel Ribands (*S.M.H.*, June 4). The Rev. P. Macpherson: Some causes of the Decay of Australian Forests (*S.M.H.* August 6). and Stone Implements of Aborigines (*S.M.H.* November 6) Mr. J. P. Josephson—Floods in the Hawkesbury (*D T.*, September 4). A paper on the Ringal of N.W. Himalaya was communicated by Baron von Müller (*S.M.H.*, October 8). Notes on Mounting for the Microscope, by Dr. Morris (*S.M.H.*, November 5). On the Adelong Reefs, by S. H. Cox, F.C.S., &c. (*S.M.H.*, November 6).]

The last Yearly Volume of the Royal Society of Tasmania contains, among other interesting matter, a series of papers by Mr. R. M. Johnston, F.L.S., &c. (pp. 199, 220, 232, 233), and Professor Tate, F.G.S., F.L.S., &c., at greater length (pp. 207, 226) upon the Fossils of the supposed Miocene Beds of Table Cape, which demonstrate their Eocene character, and indicate in some instances even more remote relations. Mr. Johnston also writes, p. 219, on a new sp. of *Vitrina*, from Geilston; and on Entomostraca, including new species of *Cypris*, from the same place. Also, p. 231, on a new sp. of *Odax*; and, p. 252, on six Fishes new to Tasmania, *Oligorus gigas*, *Erythrichthys nitidus*, *Latris ciliaris*, *Centriscus scolopax*, *Cossyphus unimaculatus*, and *Labrichthys Mortoni*, n. sp. Also, p. 233, on two species of *Hymenophyllum*, new to Tasmania; and, p. 225, on a *Lepidostrobus* cone from Campania, Tasm. Professor Tate has also a paper on "The

Community of species of Aquatic Pulmonate Mollusca between Australia and Tasmania, p. 214. Baron von Mueller, K.C.M.G., communicates a note on von Ettingshausen's observations upon the Tertiary Flora of Australia, p. 203, and a census of the Flora of Deal Island, Kent's Group, p. 282. Mr. T. Stephens, F.G S., &c., contributes a note upon the operations of Boring for Coal then (June, 1884) in progress at Tarleton on the Mersey, and near the Cascades Brewery at Hobart, and expresses his doubts as to a successful result. And Mr. Morton, Curator of the Royal Society's Museum, gives an account of the appearance of *Oestrus ovis* in Tasmania.

Volume XXI of the Royal Society of Victoria (for 1884) contains, besides the address of the President, Mr. R. J. Ellery, F.R.S., F.R.A.S., papers as follows :—

By Mr. G. S. Griffiths (p. 1) On the evidences of a Glacial Epoch in Victoria during Post Miocene times. In this paper the author dwells principally upon the phenomena of the Boulder drifts and Alluvium of the country, and argues that the theory of Dr. Croll offers a satisfactory, and indeed the only, explanation both of the Glacial Epoch, and of the great oscillations of sea level which are evidenced by the large Tertiary marine formations of Southern Australia. An interpretation of the Triple series of Victorian Golddrifts in accordance with these views closes the paper.

By Mr. James Stirling, F.L.S., Omeo (p. 29), a continuation of his review of the Phanerogamia of the Mitta Mitta source basin, with a list of all its known flowering plants and their localities. Also (p. 123) Notes on the Meteorology of the Australian Alps, with some observations as to their former glaciation, in reference to the paper by Mr. Griffiths, mentioned above.

By Mr. W. Culcheth, M. Inst. C.E., F.R. Met. Soc. On the Shingle deposits of New Zealand, with special reference to the movement of shingle under wave action, and the resulting phenomena, p. 52.

By Mr. J. Lockhart Morton, on Artificial Cooling of Hospitals, &c., p. 86.

By Mr. G. H. Ridge, giving an account of the Krakatoa eruption, as witnessed by Captain Gibbs of the American Barque *W. H. Besse*, p. 39.

By Mr. P. H. MacGillivray, M.R.C.S., F.L.S., Continuation of Papers on new or little known Polyzoa, of the families *Bicellaridæ, Catenicellidæ, Celleporidæ, Cellularidæ, Discoporellidæ, Flustridæ, Gemellaridæ, Membraniporidæ, Myriozoidæ, Salicornaridæ,* and *Tubuliporidæ.* Part VII., p. 92. Part VIII., p. 106. Also (p. 120) Note on the reproduction of the *Ornithorhynchus*, describing ova both attached and free in the uterus, and other matters of interest.

By Mr. A. W. Howitt, F.G.S. Supplementary Notes on the Diabase Rocks of the Buchan district, p. 101.

The Seventeenth Volume of the Transactions and Proceedings of the New Zealand Institute (1884) contains, besides the Anniversary Address by the President, Sir W. F. D. Jervois, G.C.M.G., C.B., &c., the following papers:—

By T. J. Parker, B.Sc. Lond., Professor of Biology, Otago Univ., on a Specimen of *Balænoptera musculus*, stranded near the Waimea River, p. 3.

By W. M. Maskell, F.R.M.S., on an Aphid, *Chermes (Anisophleba) pini*, infesting pine trees. The name *Kermaphis* is suggested as preferable to *Chermes*, p. 13; on *Ixodes eudyptidis*, n. sp. parasitic upon the Penguin, p. 19; on Coccidæ in N.Z., with descriptions of new species, p. 20.

By A. T. Urquhart, on the Spiders of N.Z., Epeiridæ, Thlaosomides, Theridiidæ, Thomisidæ, Salticidæ, Lycosidæ, p. 31.

By Prof. F. W. Hutton, on the Limneidæ of N.Z. p. 54.

By T. W. Kirk, on *Argonauta gracilis*, n. sp., p. 58; and on Variations in the Colouring of some N.Z Birds, p. 60.

By E. Meyrick, B.A., Supplement to Monograph on N.Z. Geometrina, p. 62; and on N.Z. Microlepidoptera, p. 68.

By W. Colenso, F.L.S., on Some new N.Z. Insects, belonging to *Bacillus, Deinacrida, Myrmeleon, Rhyssa, Lissonota*, p. 157.

By W. Arthur, C.E., on some N.Z. Fishes, with n.sp. of *Zeus* and *Leptoscopus*, p. 160.

By Frederick Chapman, on Moa Remains in the Mackenzie Country. This paper gives a lively account of the appearance of Moa skeletons scattered about on the surface and more or less decomposed, but in situ, and each with the monumental pile of Gizzard stones, which in many cases has outlasted the complete disappearance of the bird whose existence it commemorates, p. 172.

By H. B. Martin, Objections to the Introduction of Beasts of Prey to destroy the Rabbit, p. 179.

By D. J. Hudson, showing that the hypothesis of spontaneous generation is unsupported by experiment, p. 182.

By A. Reischell, Notes on the Ornithology of Dusky Sound, N.Z., communicated by Dr. Hector, p. 187.

James Park, Description of *Octopus,* sp. nov., p. 198.

By John Meeson, B.A., The Plague of Rats in Nelson and Marlborough. These rats, which were almost entirely males, are considered by the author to be of the species Kiore Maori (*Mus Maorium* Hutton), p. 199.

By James Hector, C.M.G., M.D., F.R.S. Revision of the Delphinidæ of the N.Z. Seas, p. 207.

BOTANY.

By T. Kirk, F.L.S., on the Flowering Plants of Stewart Island, p. 214. On the Ferns and Fern allies of the same, p. 228. On *Aralia lyallii*, n. sp., p. 293. On N. Z. Beeches, p. 297.

By T. F. Cheeseman, F.L.S., Curator of the Auckland Museum, on new species of *Ranunculus* and *Myosotis.*

By W. Colenso, F.L.S., New species of *Ranunculus, Hoheria, Hydrocotyle, Panax, Loranthus, Alseuosmia, Olearia, Gnaphalium, Gratiola, Ourisia, Fagus, Microtis, Caladenia, Thelymitra, Callixene, Astelia, Juncus, Uncinia, Carex, Hymenophyllum,* and several of the lower cryptogams, p. 237. Also list of Fungi lately discovered in N. Z., p. 265.

By D. Petrie, M.A., new sp. of *Coprosma* and *Lepidium*, p. 269, of *Uncinia*, p. 271. *Carmichælia*, p. 272.

By J. Adams, B.A., The Botany of Te Aroha Mountain, p. 275.

By J. Buchanan, F.L.S., new sp. of *Erigeron*.

GEOLOGY.

Captain F. W. Hutton, F.G.S., discusses the age of the Orakei Bay Beds, which he refers to the Pareora system p. 307. The same author describes 79 new species of Tertiary shells, p. 313. Professor Julius von Haast, C.M.G., &c., criticizes the views of the Geological Survey of N.Z. with respect to the age and arrangement of the rocks forming the Southern Alps in Canterbury and Westland, p. 332; and is answered (p. 337) by Dr. Hector, Director of the Survey, who, in the course of his argument, states that the Mount Potts and the Clent Hills beds form almost the lowest and the highest members of a great Permio-jurassic system, the sequence of which has been very clearly worked out in other parts of New Zealand. The Permian base of this system has never been found resting with any approach to conformity on the Maitai series, which is Lower Carboniferous, the Upper Carboniferous or the Lower Coal measures of N.S.W. being still undiscovered in N.Z.

The Red Sunsets have been discussed in two papers by John Meeson, B.A., p. 357; and William Ringwood, p. 386, who both, after a careful summing up of such evidence as is obtainable, agree that the approximate cause was the presence of Volcanic dust in very high regions of the atmosphere, and that this was mainly, if not altogether, derived from the eruption of Krakatoa.

The New Zealand Journal of Science, which has just died of inanition to the regret of a loyal but insufficient proportion of paying subscribers, closes with a somewhat bitter but humourous farewell to its supporters under the heading "Moriturus te Salutat" in explanation of the causes which led to the premature decease of this promising journal, at the age of two volumes, or four years.

The Seventh Annual Volume of the Royal Society of South Australia contains Papers and Notes as follows:—

By James Stirling, F.L.S., Cor. Member, on a Geological Sketch Section through the Australian Alps, from Dargo to Mount Pilot, p. 1, pl. I-II.

By W. Samuel Dixon, in a letter to Prof. Tate, expressing his conviction that no coal beds exist upon the Fitzgerald River, the sandstones of which are probably contemporaneous with the Murray Cliffs, p. 9.

By E. Meyrick, B.A., a List of South Australian Microlepidoptera, with localities of each, p. 10.

By Clement L. Wragge, F.R.G.S., F.R. Met. Soc., p. 17; and by W. A. Jones, p. 56, on The Red Sunsets, which are ascribed to Dust by the first, to Vapour by the second.

By Professor R. Tate, F.G.S., F.L.S., &c., A Remarkable and Valuable Paper on the Basin of the Lower Murray, containing (1) Historical and Bibliographical Introduction; (2) Physical Features of the Murray Plateau; (3) The Floods of the Murray, Proposals for Improvement of its Course, and on the Quality of the Water; (4) The alluvium or River Flats; (5) Origin of the Gorge (Murray Cliffs); (6) Sections; and (7) Palæontology of the Older Tertiary or Murravian; (8) Sections of the Newer Tertiary; (9) Leading Botanical Features. Also, Descriptions of New Species of South Australian Plants, p. 67; Additions to the Flora of Extra-Tropical South Australia, p. 72; and Botanical Notes, p. 74, pl. III.

By J. G. O. Tepper, F.L S., Corr. Member, on Two rare (new?) Insects (described but not named), pp. 47–48, pl. III-A.; and on the Plants of Kangaroo Island, p. 50.

The First Volume of Proceedings of the Royal Society of Queensland, for 1884, contains the Inaugural Address, by the Hon. A. C. Gregory, C.M G., F.R.G.S., &c., and a paper on the Mount Morgan Deposits, p. 141, by the same author, and the following papers of general interest—

By F. M. Bailey, F.L.S., Government Botanist, Contributions to the Queensland Flora, being supplements I. II. and III. to the Synopsis, pp. 8, 84, 148, pl. I; and a contribution towards a Flora of Mount Perry, p. 61.

By E. Palmer, M.L.A., Hot Springs and Mud Eruptions on the Lower Flinders River, p. 19, pl. II.

By C. W. De Vis, M.A., on the Occurrence of the Moa in Australia, p. 23, pl. III-IV; on *Ceratodus Fosteri* in the Condamine postpliocene, p. 40; on New Fishes belonging to *Therapon*, p. 56; *Serranus, Genyoroge, Lethrinus, Cossyphus, Salarias*, and *Chœrops*, p. 144; on a New *Hyla*, p. 128; on New Lizards of the Genera *Silubosaurus, Oedura, Amphibolurus*, p. 53; *Myophila n.g. Lygisaurus n.g. Macrops n.g.*, p. 77, and *Heteropus*, p. 166; on n. sp. of *Hoplocephalus* (pp. 100, 136, pl. XV.) of *Rhipidura, Micrœca, Melithreptus, Oedura* (p. 158), of *Halmaturus* (p. 107), and *Onychogalea*, p. 157.

By J. Falconer, C.E., on Springs, with particular reference to the water supply in Queensland, p. 28, pl. V-X; and on the Queensland Gold Deposits, p. 131.

By H. F. Wallman, on Mineral Pseudomorphism, p. 32.

By Mr. James Thorpe, on the Bowen Cyclone, January 30, 1884, p. 35, pl. X.

By Henry Tryon, on Certain Aboriginal Rock Drawings which he considers as Totems, p. 45, pl. XI.; and communication on the Savo Megapode, from A. H. Kissack, Esq., p. 181.

By the Rev. E. Spicer, M.A., on an Ant which produces audible Sounds.

By Kendal Broadbent, on the Migration of Birds at Cape York, p. 93.

By Mr. J. Bancroft, Esq., M.D., on the Food of the Aborigines of Central Australia (chiefly Nardoo, Grass Seed, Purslane Seed, Sundry Bulbs), p. 104. [On Indian Wheats in Queensland, p. 176.

By Baron F. von Mueller, K.C.M.G., &c., on *Dendrobium cincinnatum*, sp. n.

By Charles Knight, F.R.C.S., F.L.S., Wellington, N.Z., on a new Species of *Parmelia* from Mount Kosciusko, p. 114, pl. XVI.

By A. J. Duffield, Esq., Ethnological Notes on New Ireland and its Archipelago, p. 115, pl. XVII.

By L. A. Bernays, Esq., F.L.S., Exotic Fruits new to Queensland, p. 136.

By James Pink, Esq., F.R.H.S., A Plea for the Practice of Hybridisation in Plants, p. 161.

The principal work in Botanical Science, outside the Societies, has been as follows —The Eucalyptographia of Baron v. Mueller, of which two volumes are now complete, furnishes descriptions of a hundred well-defined species of *Eucalyptus*, and though some fifty more remain for investigation, it is not probable that they will present any marked instances of deviation from the types already recorded. Improved, however, as the classification of this extensive and puzzling genus already is, some still more *natural* system, based on carpologic considerations is regarded by the author as both desirable and within reach. It is evident that the grouping of species according to the shape and opening of the anthers may lead sometimes to very erroneous conclusions. Mr. J. E. Brown, F.L.S., in his splendid work on "the Forest Flora of South Australia" affords two illustrations of this remark. His figure of *Eucalyptus paniculata* Smith, is made to represent a small White Gum, of little value, in South Australia, and also the lofty White Ironbark of N.S.W., the toughest and most durable of all Ironbarks. Again, *E. leucoxylon*, of which three figures are given with white, and one with red flowers, includes a Blue or White Gum of S. Australia and Victoria, as well as our Red-flowered Ironbark, remarkable for the dark colour of its timber and deep corrugations of its bark. This tree is probably Cunningham's *E. sideroxylon*, and no one who has seen the two trees growing in their native forests can suppose that they are identical, or even nearly allied. It is therefore much to be hoped that Baron von

Mueller will work out, with his accustomed energy. the more promising classification which he suggests, based on the characters of the fruit. No one else has qualifications comparable to his for this difficult and important task.

The same author has also largely increased the number of species catalogued in his Census of Australian Plants, so that they now amount to nearly 9,000, The number of species now recorded for New South Wales, exclusive of the lower Cryptogams, is 3,154; of which many are also common to Queensland, and many to Victoria.

He has also published during the last year another number of his "Descriptive Notes on Papuan Plants." There are about 1000 now recorded. "Of these the writings of Blume, Miguel, and Schiller gave about 380; Beccaris 'Malasia' added to them about 140, largely new to science; the 'Papuan Plants' up to date made additions to the extent of about 420, mostly known from India and Australia before (including 34 evasculares); De Candolle's 'Monographia' and some other recent works give about 60 more. . . . . . From these and other data we are justified to conclude already that the Botanic (though far less Zoologic) features of the Papuan lowlands are mainly Malayan . . . whilst the known presence of *Araucaria* and *Epacridæ* in temperate altitudes vindicate already for the upland Flora of New Guinea to some extent an Australian character, whilst the vegetation of the North-east portion of the Australian Continent is largely Malayan also." One may hope that the collections of the Geographical Society's Expedition, which are now in Baron von Mueller's hands, will still further enlarge our knowledge of this interesting borderland between two floras so distinct as those of Australia and South-eastern Asia.

To Mr. R. D. Fitzgerald, F.L.S., we are indebted for another instalment (Vol. II., Part 2) of his great work on Australian Orchids. It shows no falling away from the high standard of the preceding numbers, and has a kind of accidental interest from the fact that it contains the figures and descriptions of the smallest and the largest of Australian Orchids. *Bolbophyllum* *minutissimum* Müller, a plant so small that it might escape the notice of the casual observer, was found by Archdeacon King in 1849, and cultivated by the late William Sharpe Macleay in the garden within whose boundaries we are now assembled. It is one of our rarest orchids, and yet was once grown here in the midst of the city. *Galeola Ledgerii* Mueller, on the other hand, is the largest, found only in the dense cedar scrubs of the Eastern Coast. It is a climber, attaining a height of 30 feet, and a spike of its flowers has been found to measure six feet in length and three in breadth. *Cryptostylis ovata*, now peculiar to West Australia, may possibly be a form of *C. longifolia*, modified by long separation, as there are no orchids in N. and N.W. Australia. Mr. Fitzgerald's observations on the Fertilisation, Variation, and Distribution of species are as interesting as his illustrations are beautiful.

Mr. J. E. Brown's Forest Flora of South Australia, referred to above, is still progressing; and Mr. F. M. Bailey, F.L.S., author of the Synopsis of the Queensland Flora is adding supplements to that work from time to time.

The Rev. W. Woolls, Ph.D., F.L.S., &c., has lately published a small hand-book to "The Plants of New South Wales," pp. 122. The nomenclature and arrangement are adopted from the Census of Baron v. Mueller, but a preliminary essay, and the notes and observations, which are both instructive and interesting, are original. It is far the best book that we have upon the subject; and, although only intended to supply a temporary want, is likely to become and to remain a popular guide to the Botany of New South Wales.

I am not aware that anything of note has occurred in Zoological matters outside the Societies in Australia, with the one important exception of Mr. Caldwell's investigations, a short abstract of which was given by himself before the Royal Society, N.S.W. (See above, p. 867.) Further information and details we shall receive in due course. I suppose all of us have heard, and heard with regret, of the illness which temporarily incapacitated that brilliant and vigorous student in the pursuit of his chosen object, and I feel it a happy privilege to be warranted to state before this meeting that he is now, by the last advices, rapidly recovering his natural health and energy.

In Geology there is in like manner little to report outside of the Societies. But I may mention that the exploration of the Wellington Caves, including several newly-discovered ramifications, has been continued during the past year by the Australian Museum, with funds provided by Parliament, and that among the fossils collected are, as determined by Professor Owen, bones of a new species of *Thylacoleo*, of *Phascolomys curvirostris*, n. sp. and *Palorchestes Rephaim*, n. sp.

A new step has also been taken by the Department of Mines, which will be hailed with enthusiasm by all who have or desire to have any knowledge of Australian Geology and Palæontology. The labours of von Ettingshausen on the Tertiary Flora, those of De Koninck on the Palæozoic Fauna, and, generally, the most valuable and standard books on Australian Palæontology, are at the present time, as I am given to understand, in preparation for the Australian reader, who hitherto has had small opportunity of access to these treasures. The Government has arranged for the translation of the Text, which will be printed and published here, and for the reproduction of the Plates, which is to be effected in England, or at any rate in Europe, under the supervision of the original authorities. Some of these plates indeed—as for example those which illustrate von Ettingshausen's Tertiary Flora—are already printed, and, I believe, in the colony.

May I be allowed in conclusion to offer a few remarks, of quite private interpretation, upon a subject which must interest not only all Scientific enquirers, but also all who are capable of rational freedom, and are yet not at all disposed to dance in the Freethought Carmagnole. A few weeks ago I read, with astonishment and dismay, an article by Mr. Gladstone upon the "Geology of Genesis." It was published in the *Nineteenth Century* of November, under the title "Dawn of Creation and of Worship," and was professedly a polemical discussion of M. Reveillé's "Prolégomènes de l'histoire des

Réligions." The sense of astonishment was perhaps unreasonable. I must acknowledge that by this time one ought to have outgrown any possibility of having that feeling aroused by any new posture of that ingenious, versatile and eccentric orator. But the dismay which I felt had a better foundation. There has been for at least the last thirty years in the liberal, learned and intellectual society of which Mr. Gladstone has been one of the conspicuous ornaments, a general, if tacit, consent to discountenance, or to ignore, the futile attempts either to overthrow the precise conclusions of Science in order to protect Religion from an imaginary peril, or to force human knowledge and revelation into a Procrustean conformity, as if they were moulded upon the same type and had to be reduced to an identical measurement. For the Scientific, as such, have no enmity except to false Science; the Religious, none except to false Religion. And experience had shown so fully to the enlightened society in which Mr. Gladstone lives, the mischief which arises from the provocation of a quarrel which no natural hostility underlies, that the oppositions and accommodations of mischiefmakers between Genesis and Geology, had been hushed and almost forgotten, when all at once the most conspicuous person in Britain, almost in Europe, steps out into the field in pasteboard armour as a fresh champion in the name of Procrustes. Now I think that both sides must acknowledge, under these circumstances, some feeling of dismay. Mr. Gladstone has learnt little from all that experience. He evidently supposes that ascertained facts may, by the exercise of sufficient ingenuity, be twisted into contradiction with themselves, or that the writer of the first chapter of Genesis was a Geologist by revelation. Such ways of thought may well excite ridicule, although they deserve an indignant repudiation. Now in the December number of the *Nineteenth Century*, with some surprise, I saw that Huxley had donned his armour too, and had come out into the field against Gladstone. It must have been the fame of the champion and not his challenge or his cause that brought Huxley to the front. For the arguments against which he had to contend are lower than childish. How can you seriously deal with an antagonist who divides animals into poetical or sentimental alliances, as air population, water population, and earth population?

And this brings me to two points of some importance to us all. First: The absolute necessity of getting rid of sentimentality and nebulosity of language in scientific subjects. In Science, precise definition is the only virtue of language. However elegant the phrase, if it be ambiguous, or even obscure, it is mischievous, and that in proportion to its elegance. The second point—which, like the first, is patent enough—is, that men may live habitually in the society of scientific and accurate thinkers, may acquire all the phraseology and cram of science, which is generally called knowledge, may be able to discourse learnedly upon scientific subjects, and even to prosecute particular lines of inquiry with success, without ever having gained the Scientific spirit, or even formed a true conception of the Logic of Philosophy.

On the motion of the Hon. P. G. King, M.L.C., a unanimous vote of thanks was accorded to the President for his valuable Address.

The Treasurer, the Hon. J. Norton, M.L.C., reported on the financial condition of the Society, showing a credit balance of £140 0s. 8d.

On the motion of Dr. Cox, a vote of thanks was carried by acclamation to the Hon. W. Macleay, M.L.C., F.L.S., &c, in recognition of his eminent services to the Society, and with especial reference to his munificent donation of the Hall in which the meeting was held.

The President reported that Dr. von Lendenfeld had made the Society a donation of a painting in oils, with key, representing a number of new Sponges and Medusæ which he had examined and described in the Proceedings of the Society. The thanks of the meeting were conveyed by the President to the donor, who made a suitable response.

The following gentlemen were elected

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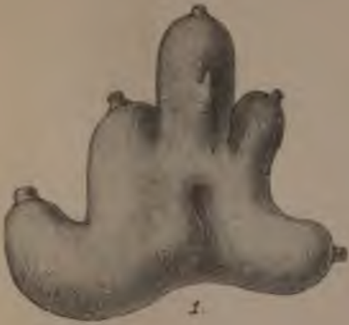

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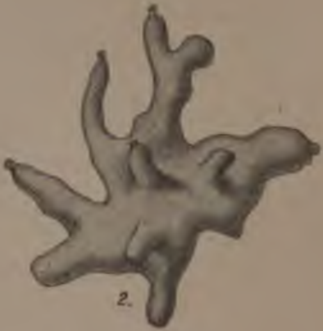

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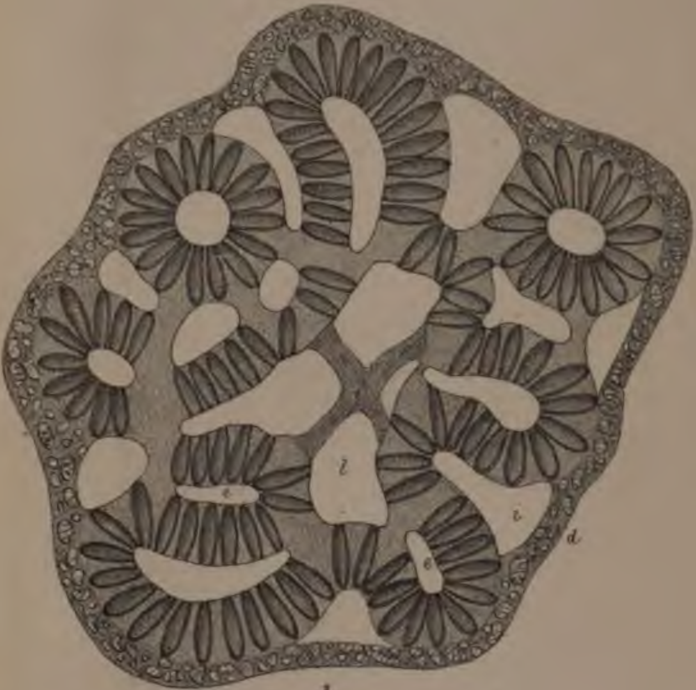

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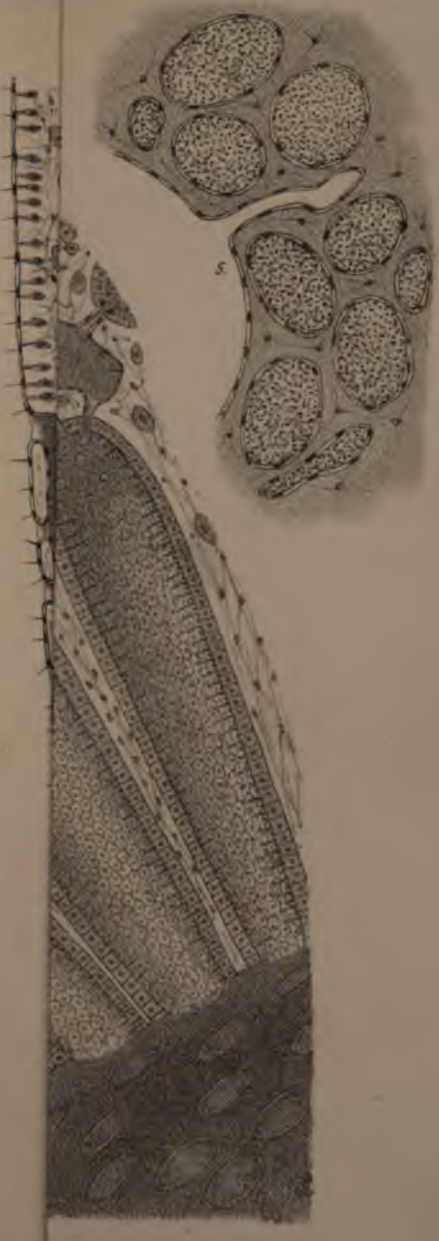

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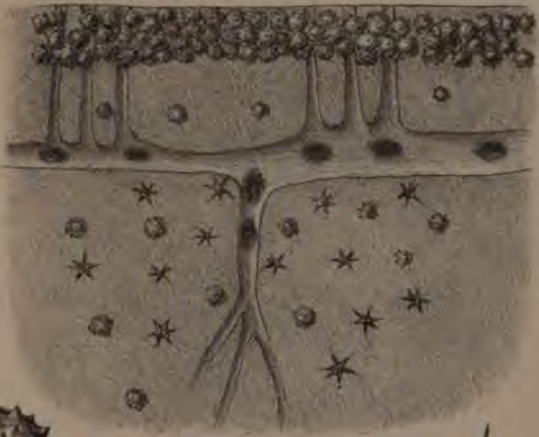

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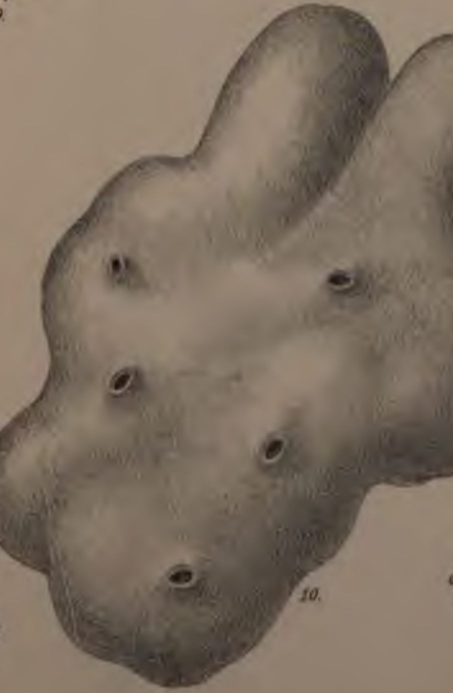

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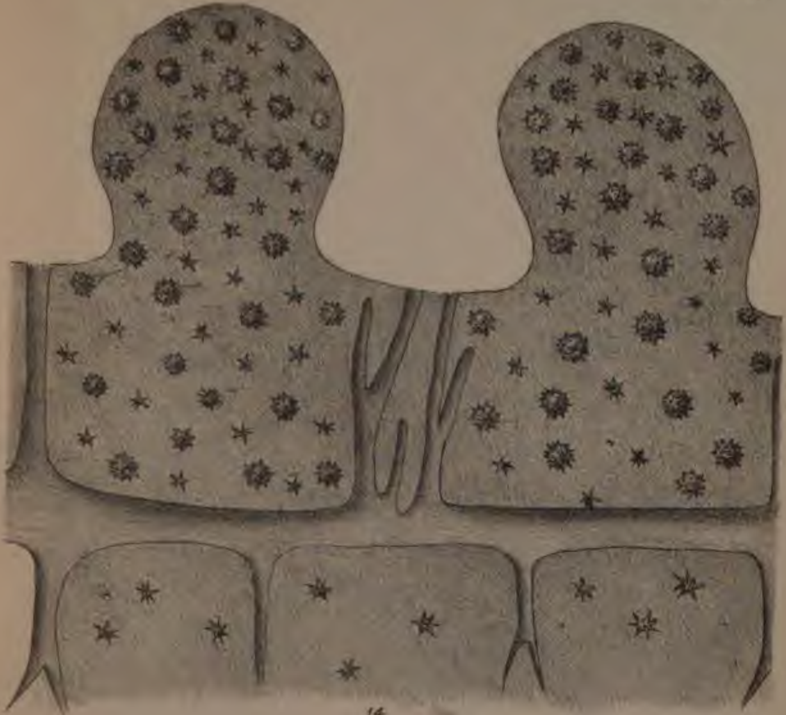
12.

11.

v. Lendenfeld del.

S. Sedgfield lith.



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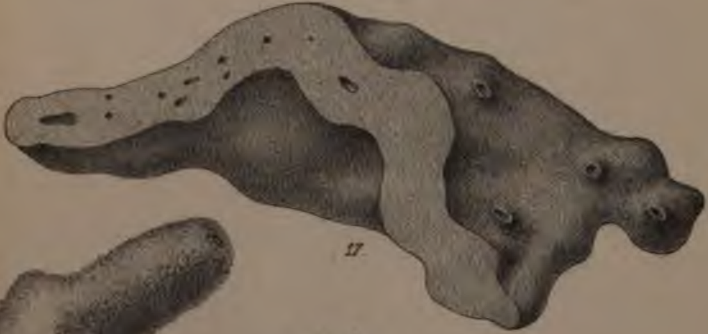

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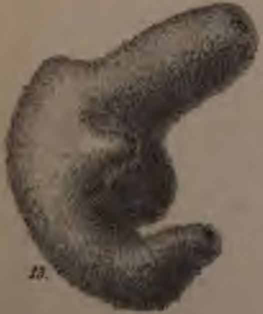

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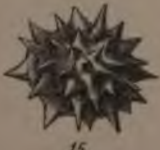

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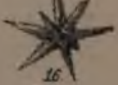

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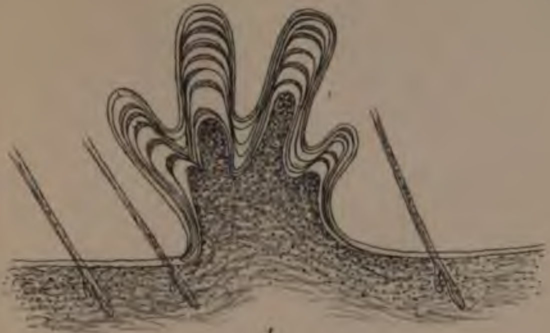
S. Sedgfield lith.



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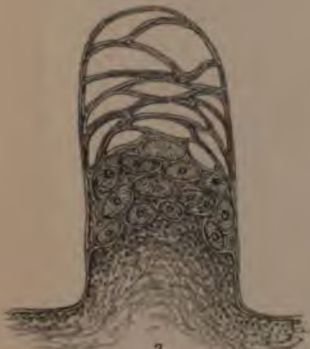

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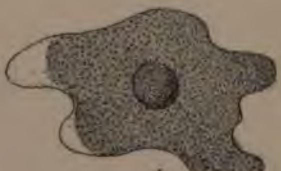

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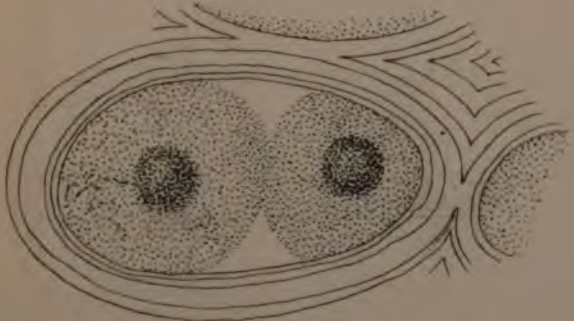
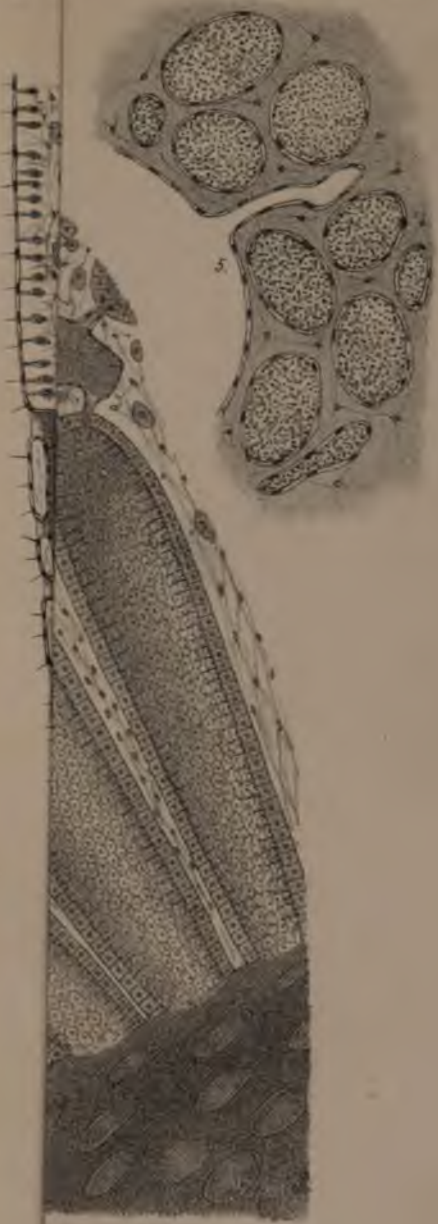


3.

v. Lendenfeld del. S. Sedgfield lith.

P.L.S. V

PL. 2.



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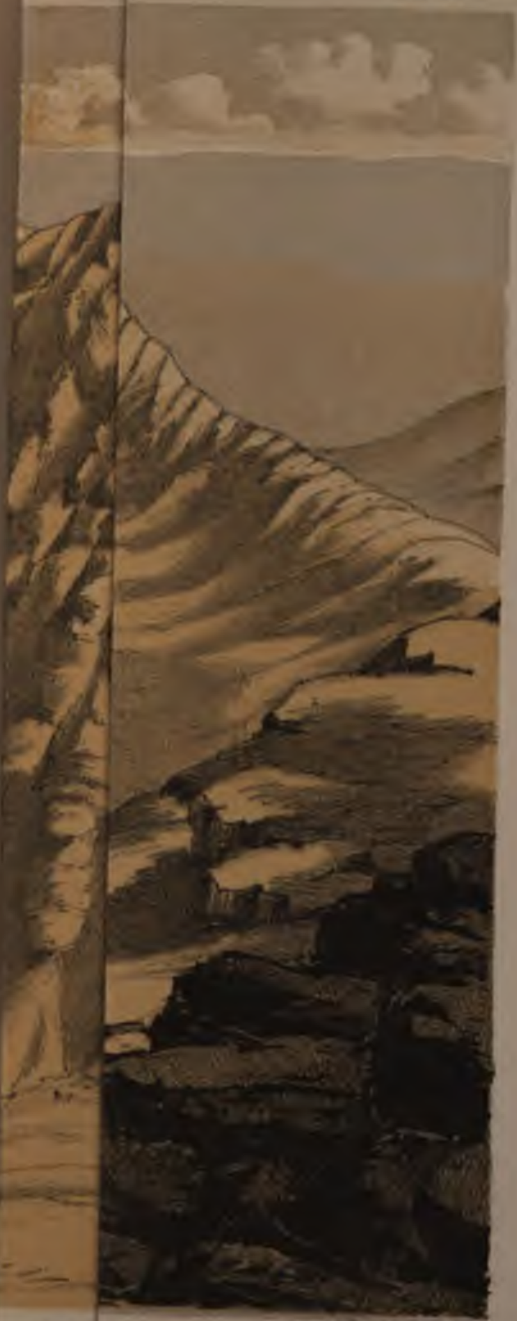
S. Sedgfield lith.

A

PL. 8.



S. Sedgfield lith.

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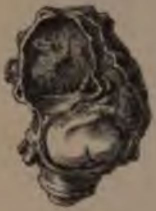
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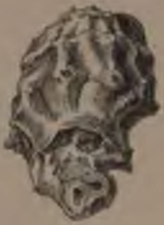
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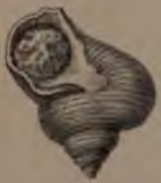
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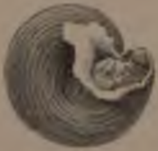
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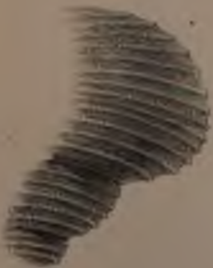
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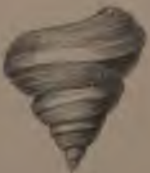
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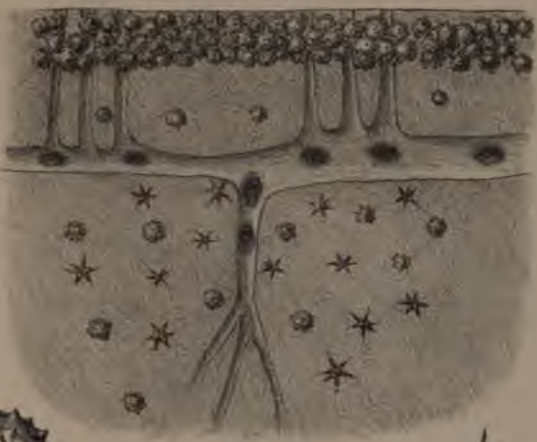
S. Sedgfield lith.



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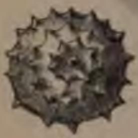

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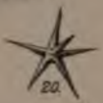

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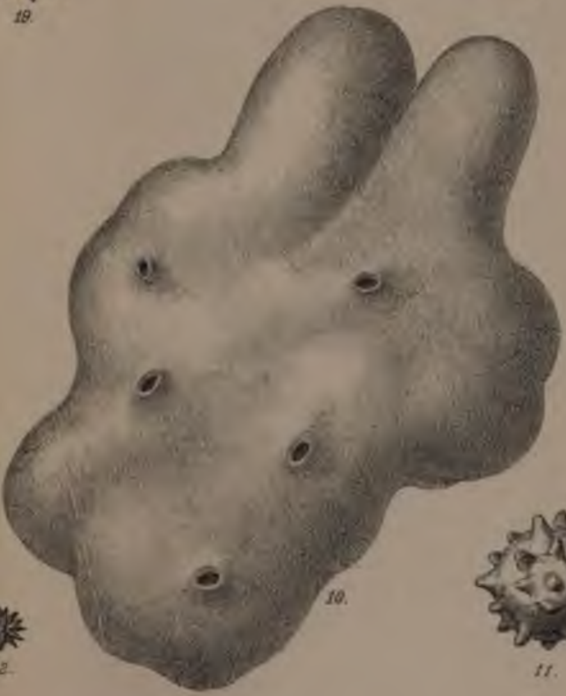

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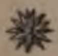

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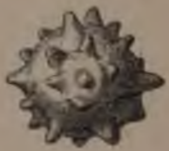

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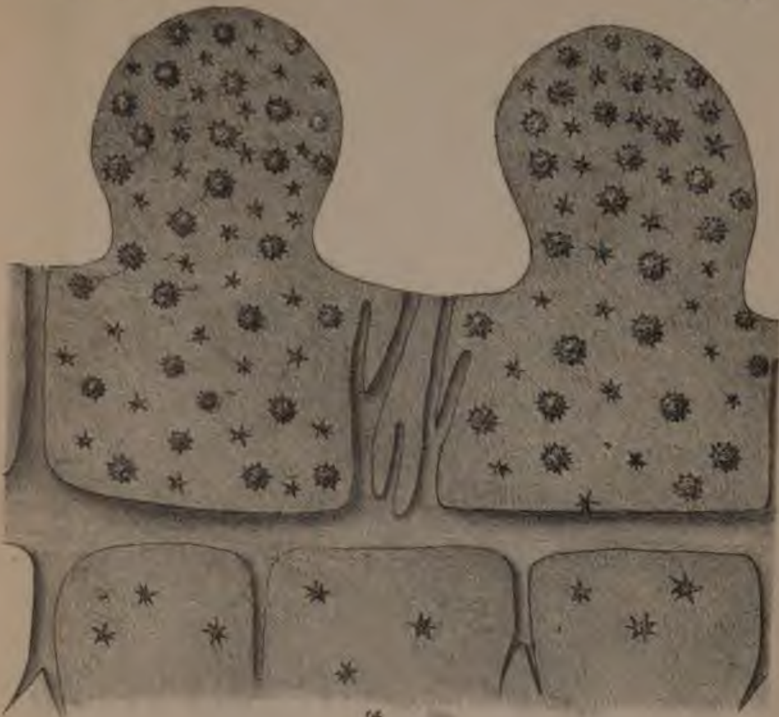
S. Sedgfield lith.



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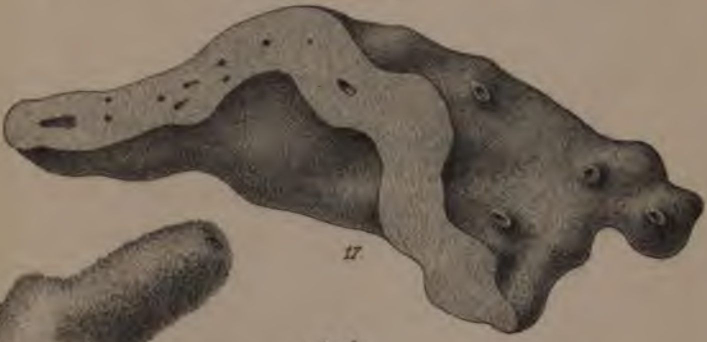

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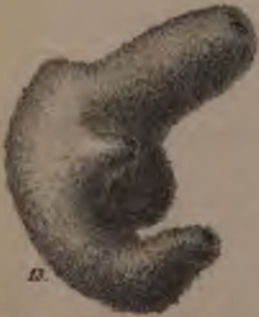

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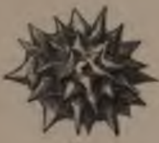

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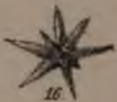

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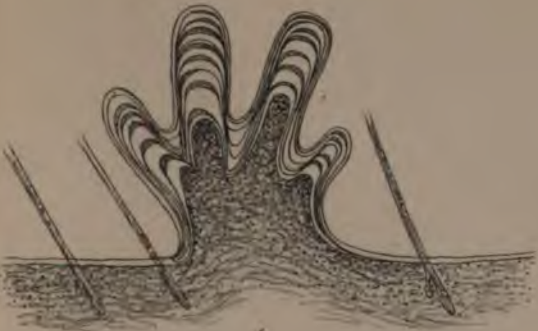
S. Sedgfield lith.



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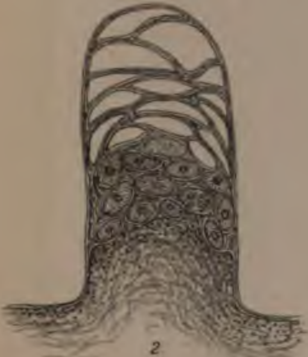

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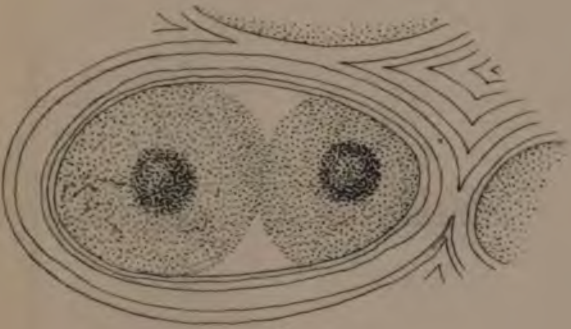

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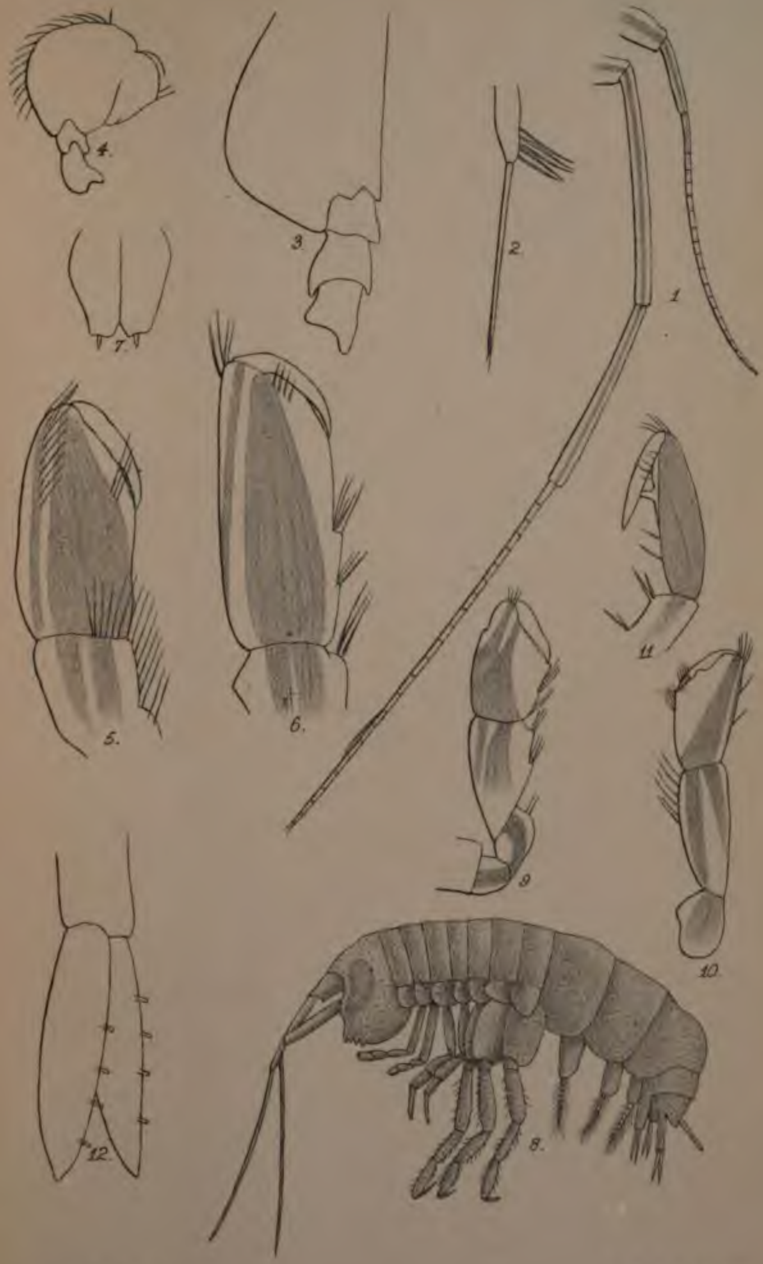

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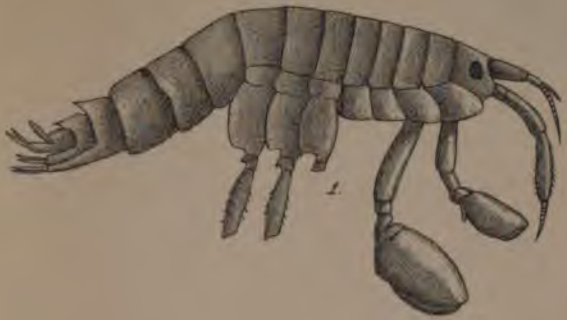

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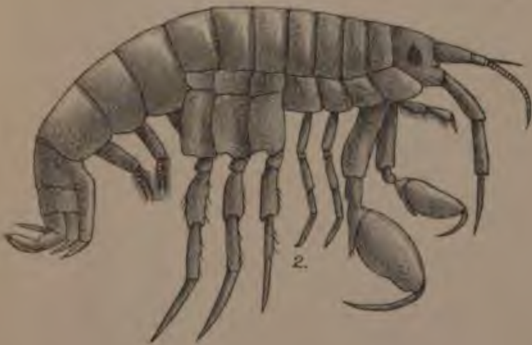

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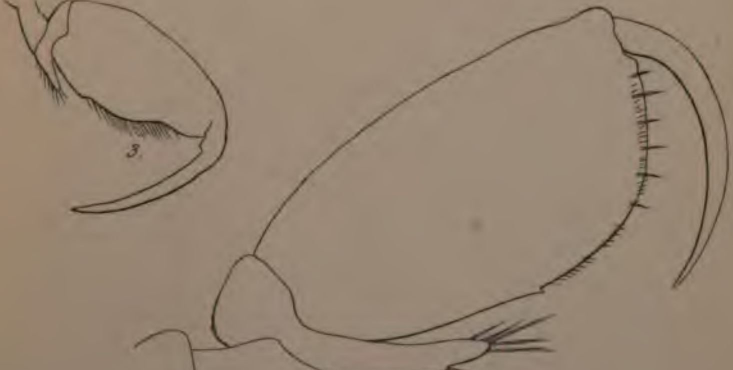

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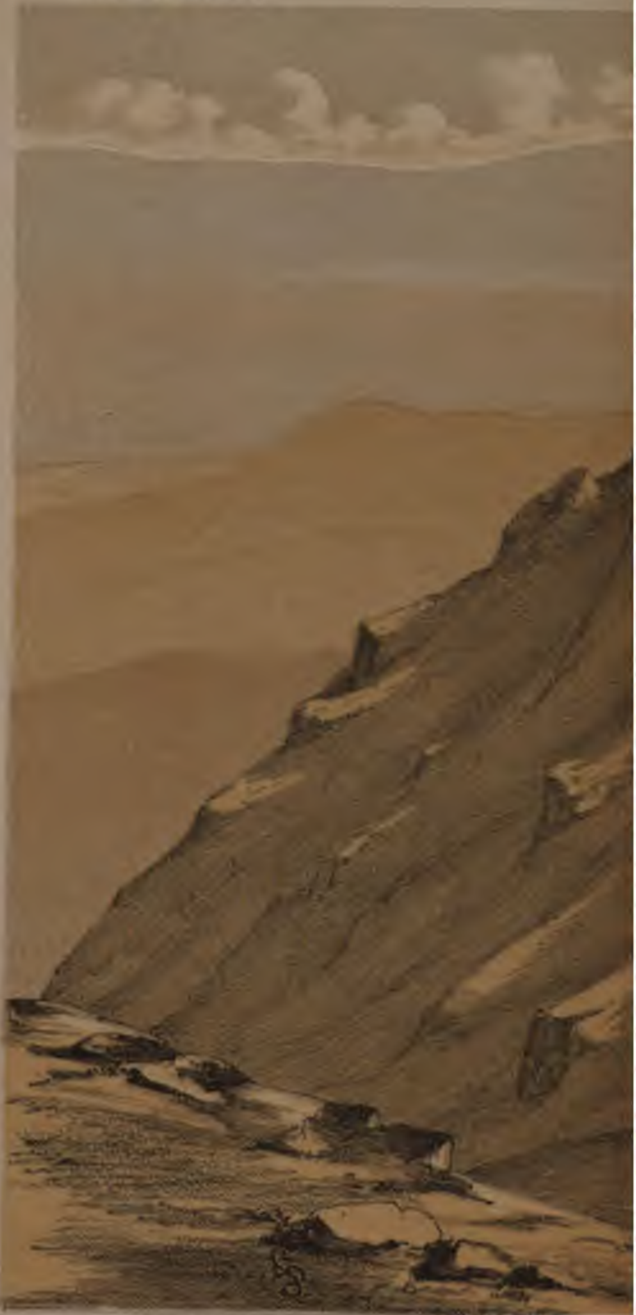
4.

W. A. H. del.

S. Sedgfield lith.

P.L.S. Vol. 10.



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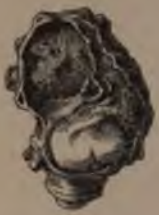

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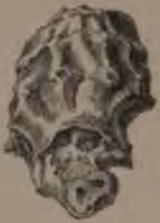

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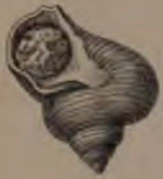

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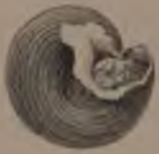

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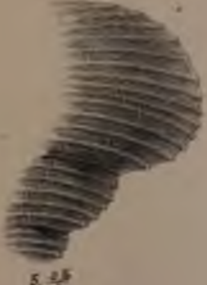

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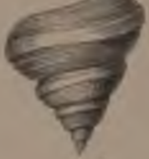

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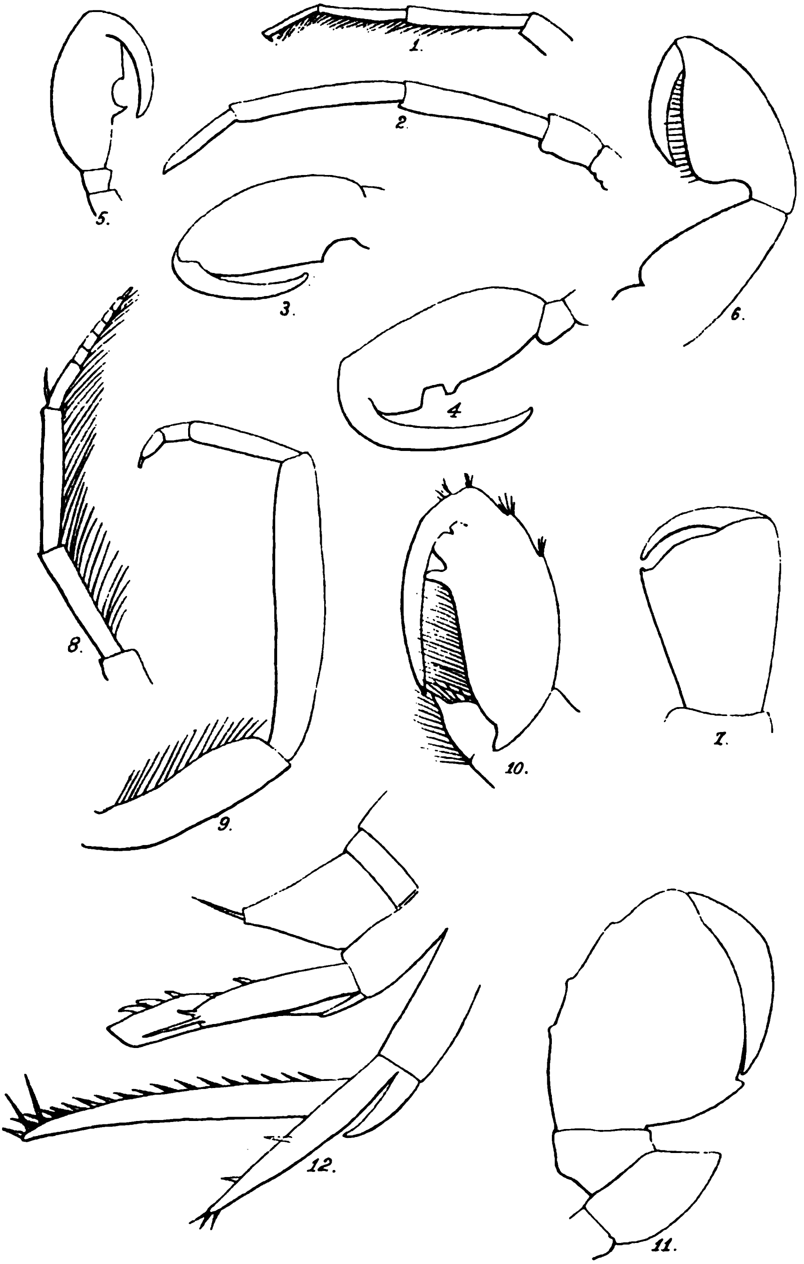
P.L.S. Vol 10. Pl. 17.



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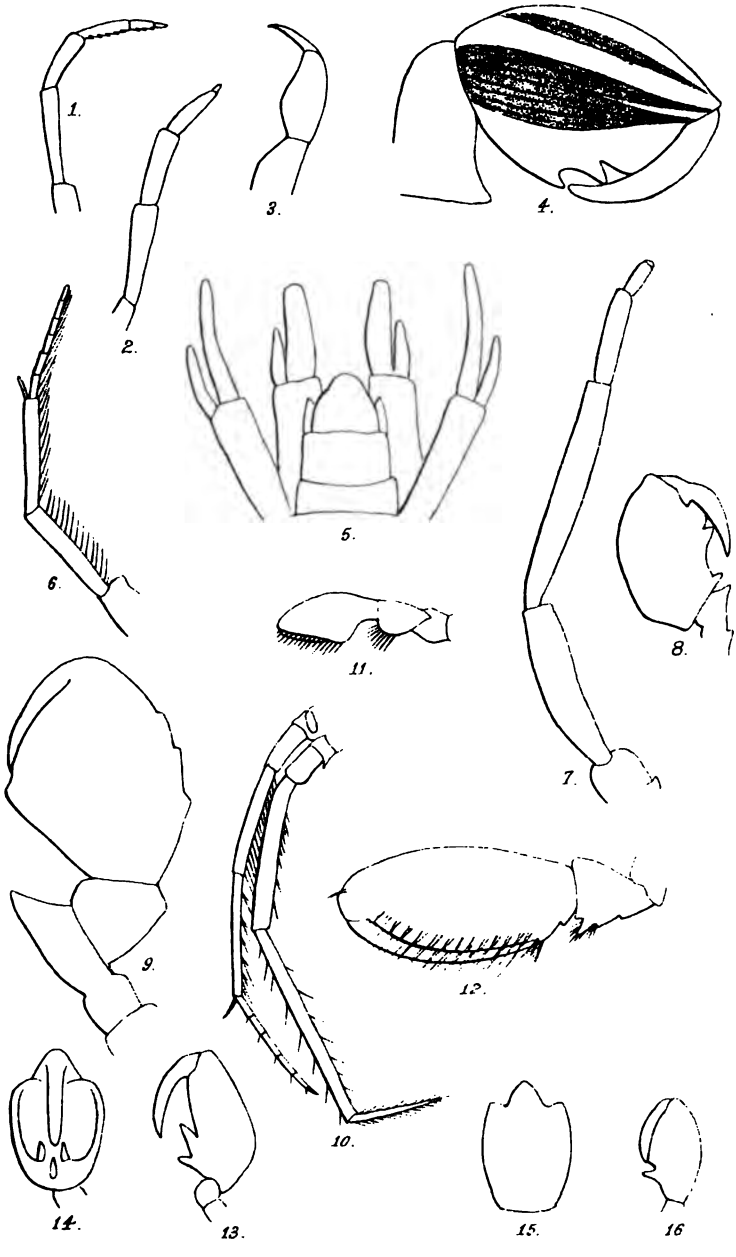
P.L.S. Vol. 10. Pl. 18.



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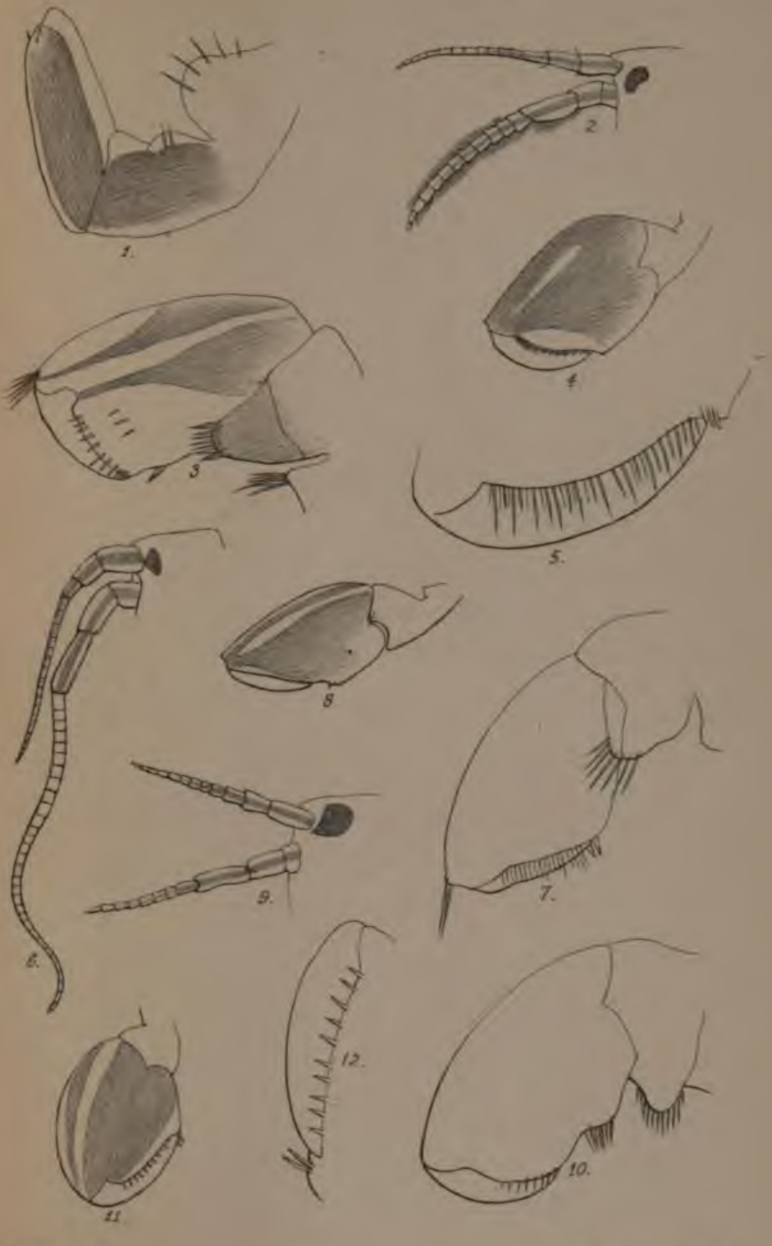
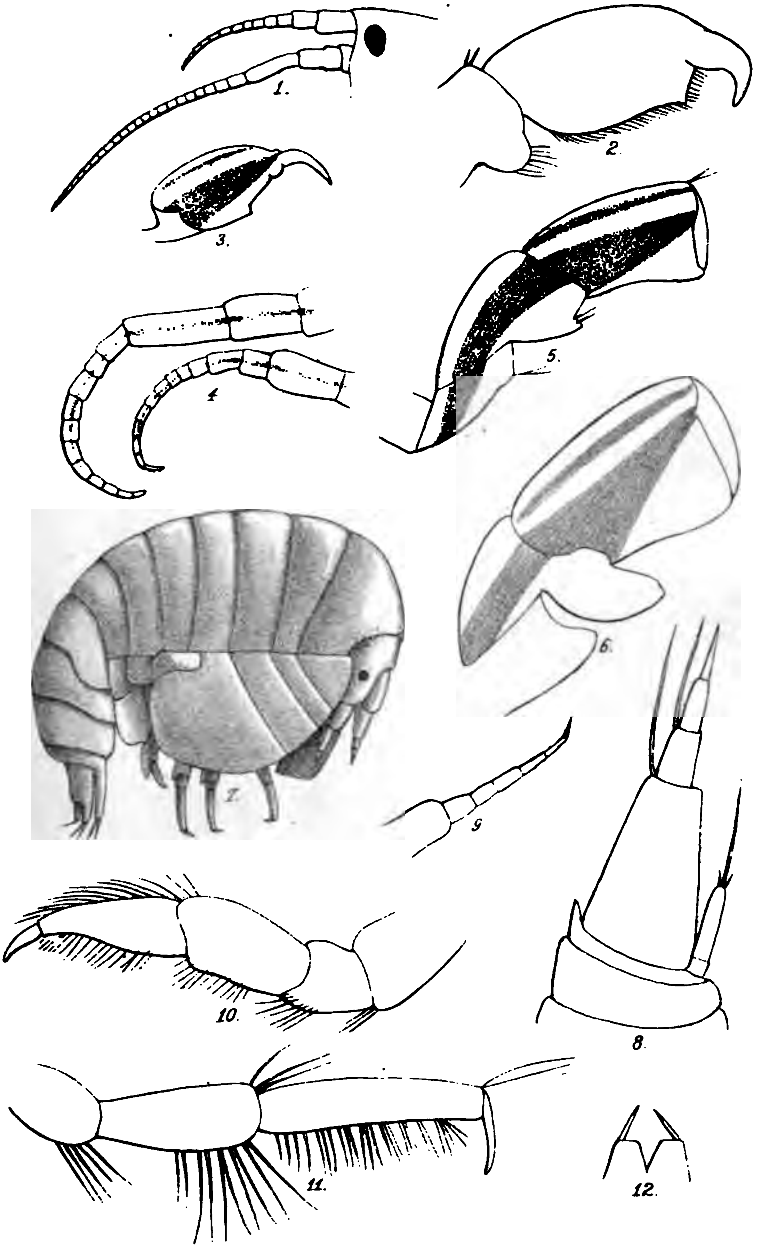


W. A. H. del. *S. Sedgfield lith.*

P.L.S. Vol 10.

Pl. 11.



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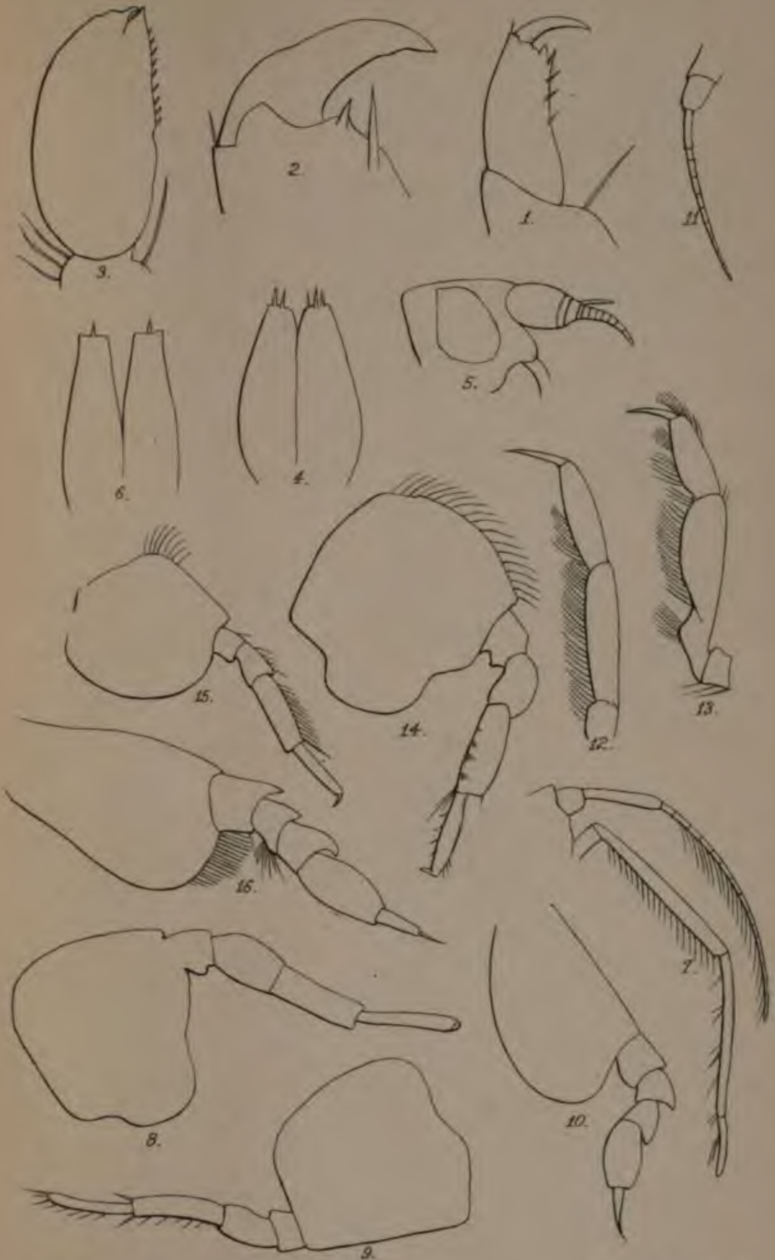

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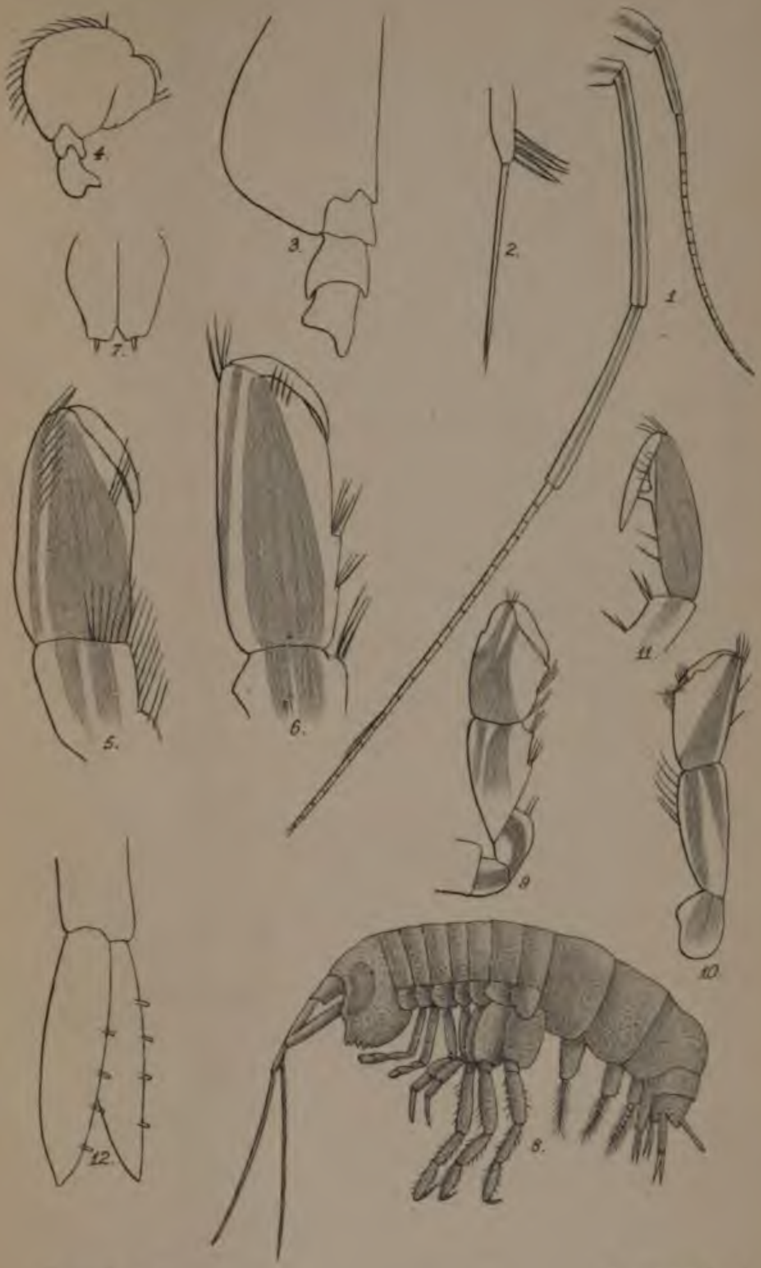
S. Sedgfield lith.

Pl. 13.



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S. Sedgfield lith.

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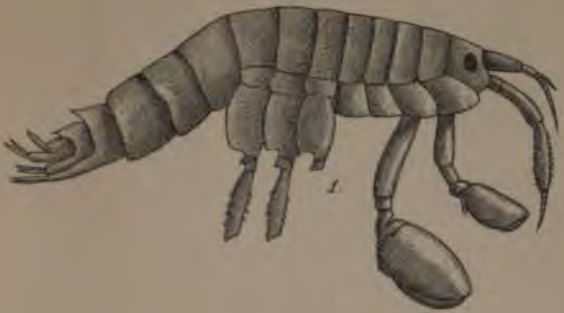

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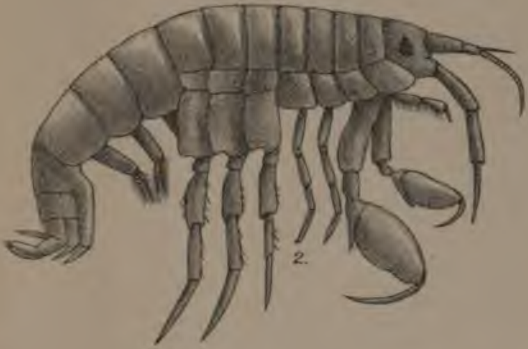

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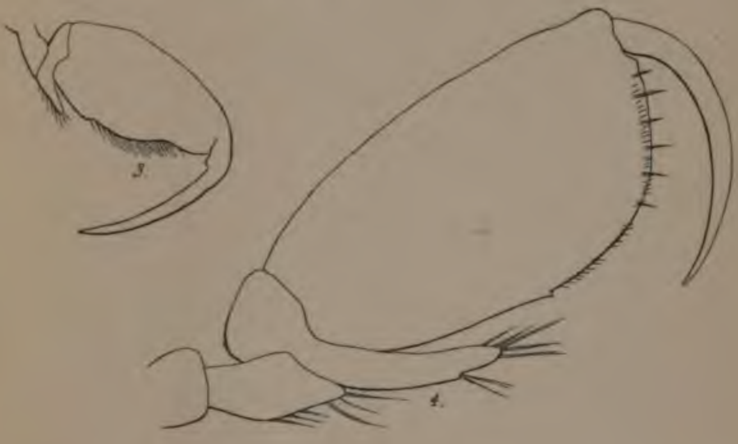

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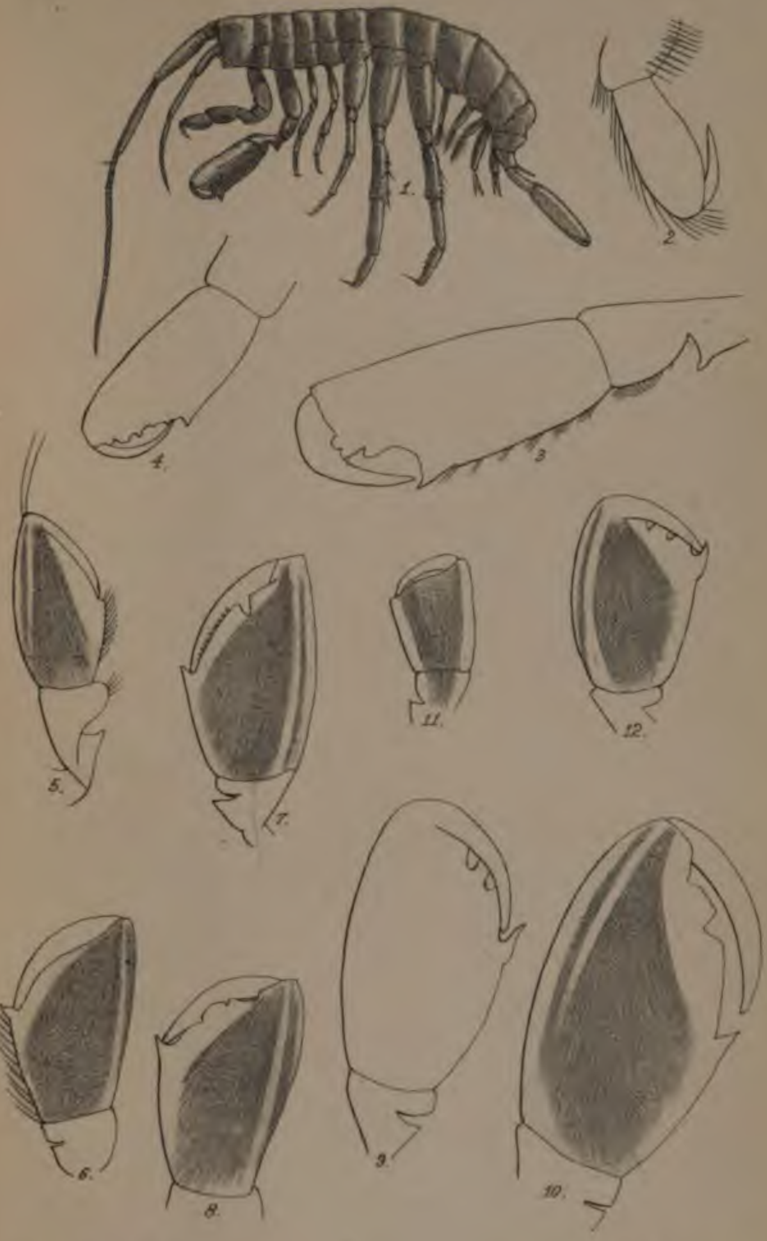

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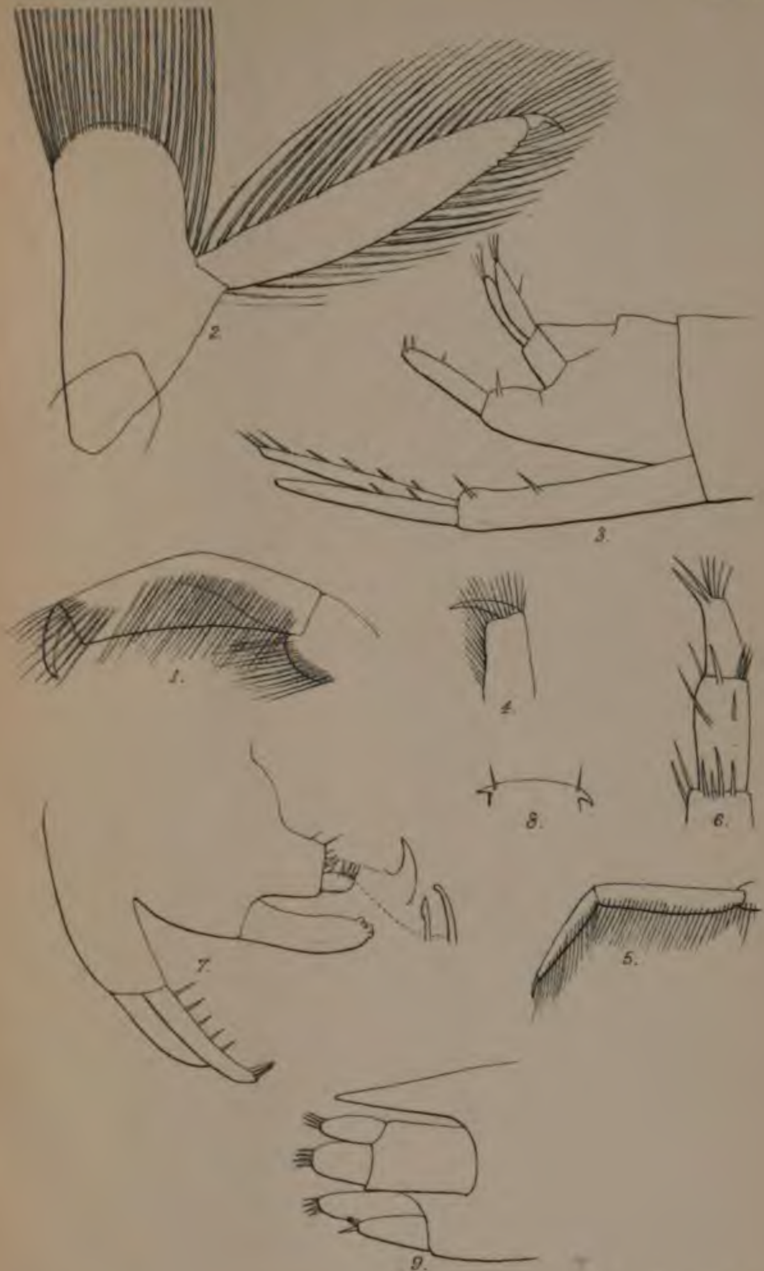
P.L.S. Vol. 10. Pl. 16.



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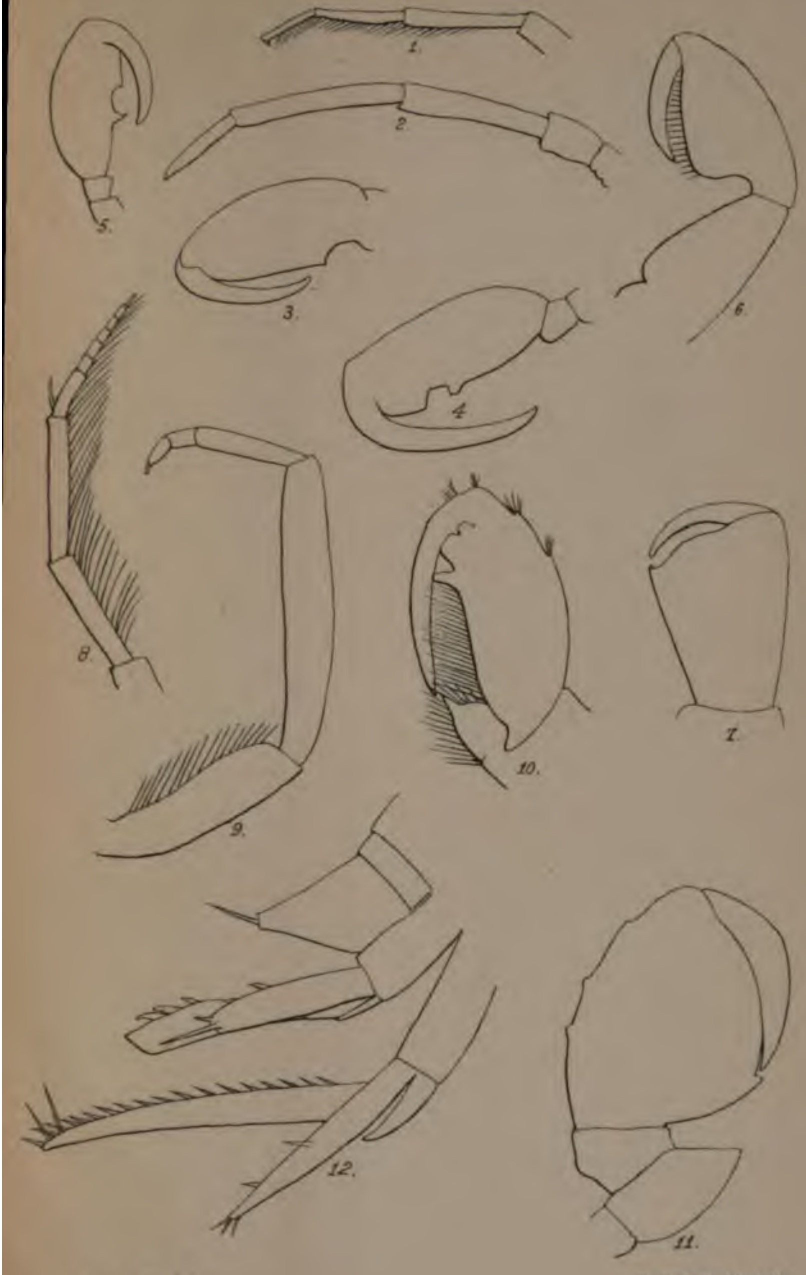
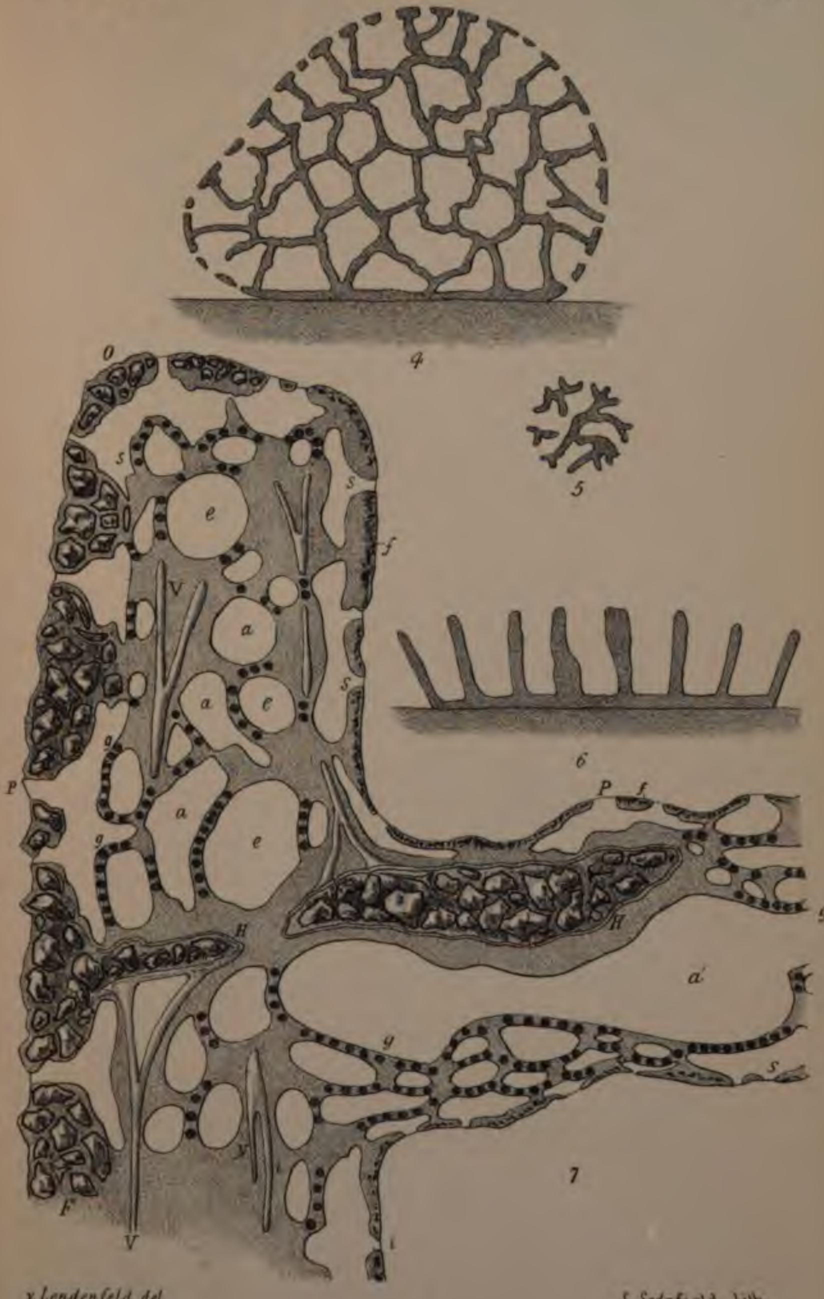
P.L.S. Vol. 10. Pl. 17.



W. A. H. del. S. Sedgfield lith.

P. L. S. Vol. 10

Pl. 27

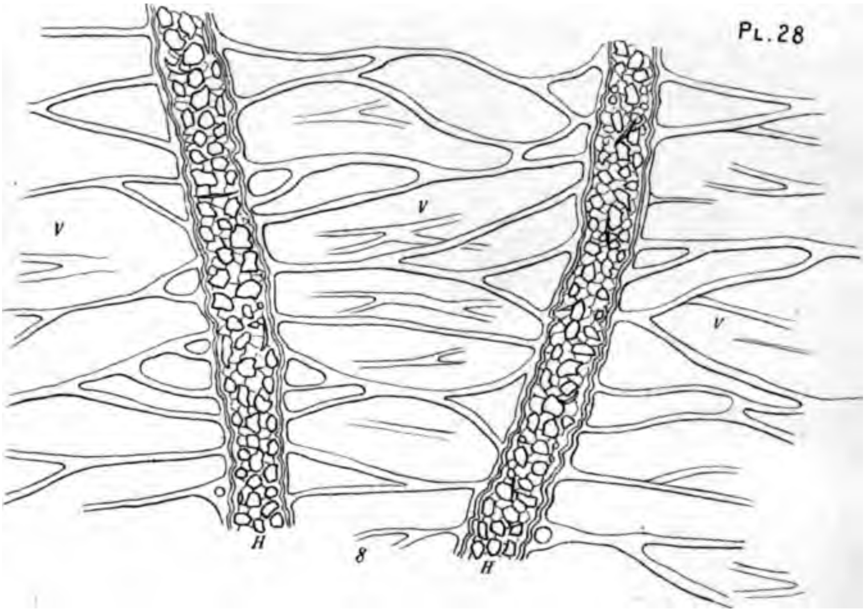


v. Lendenfeld del.

S. Sedgfield lith.

P. L. S. Vol. 10.

Pl. 28



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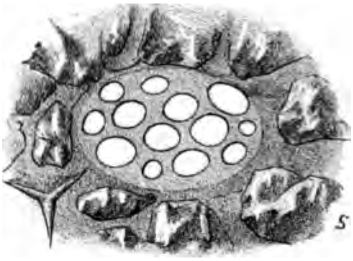

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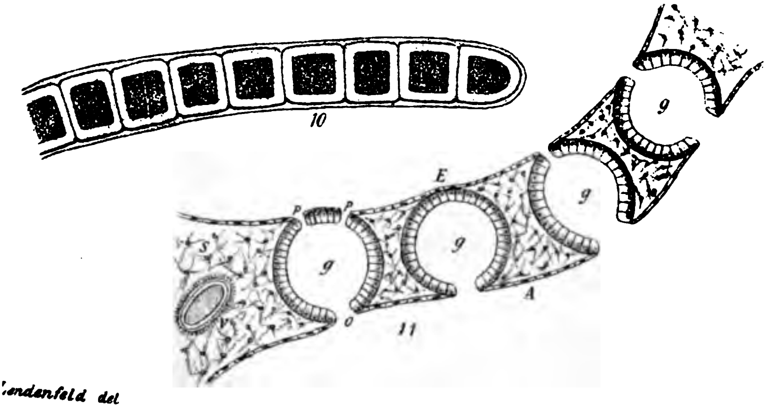

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11

endenfeld del

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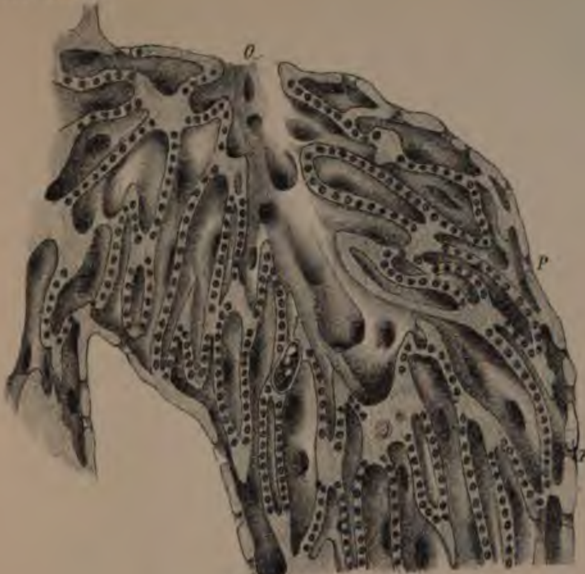

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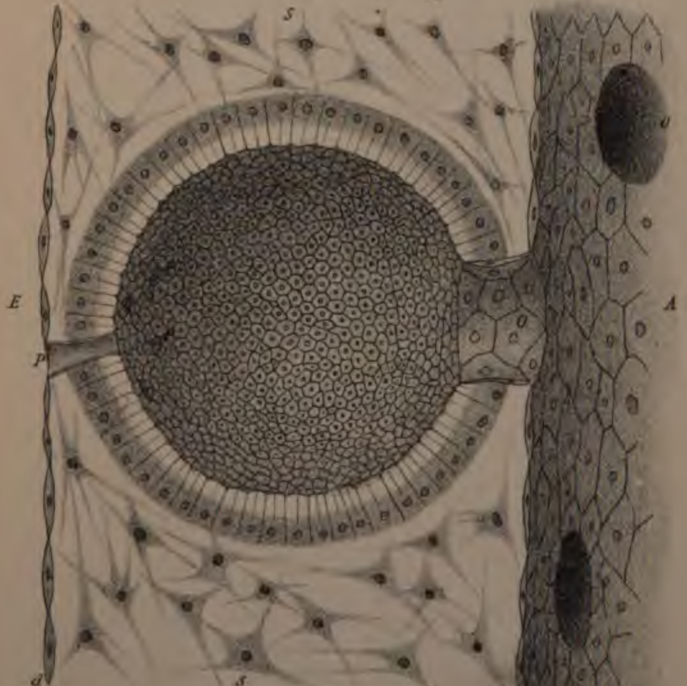

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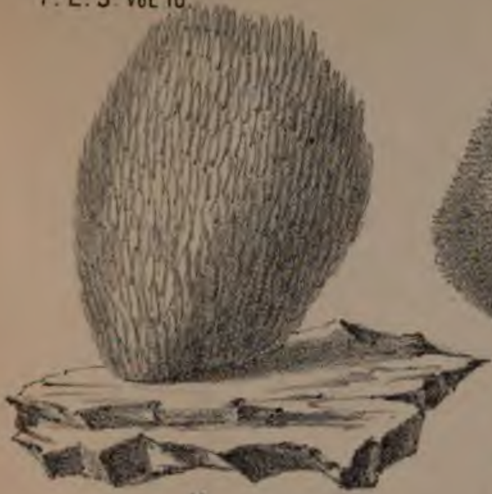
v. Lendenfeld del. S. Sedgfield Lith.



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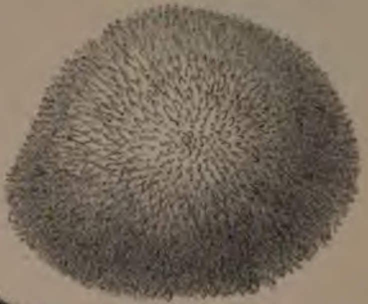

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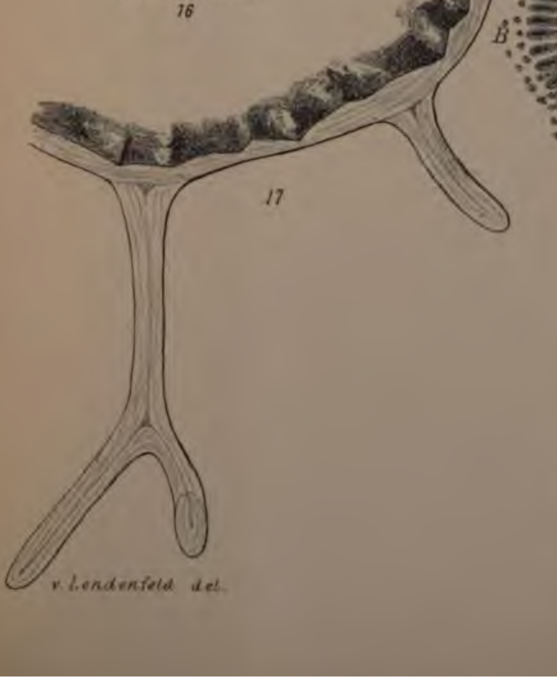

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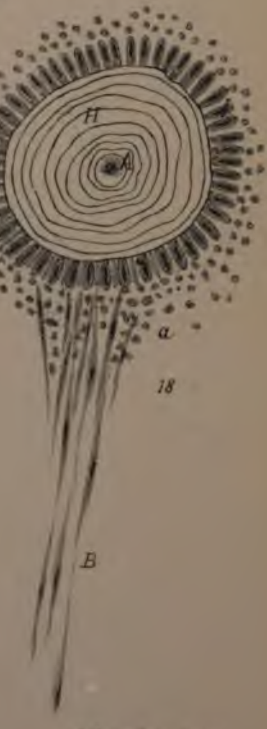

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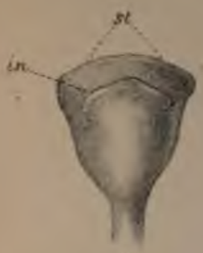
S. Sedgfield lith.



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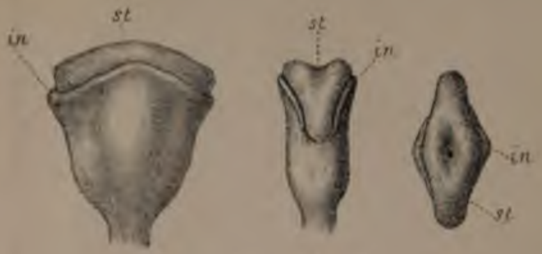

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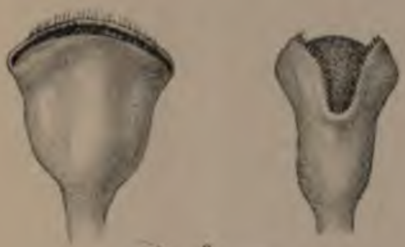

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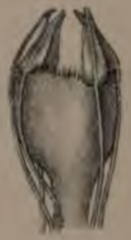

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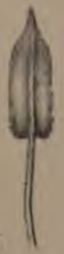

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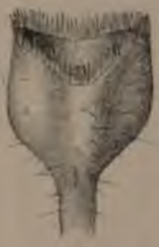

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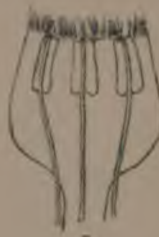

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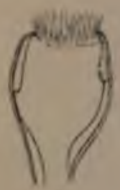

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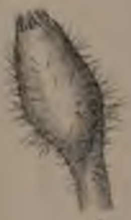

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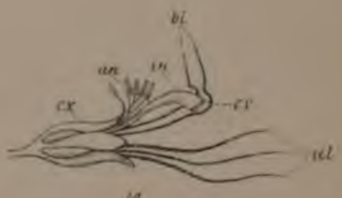

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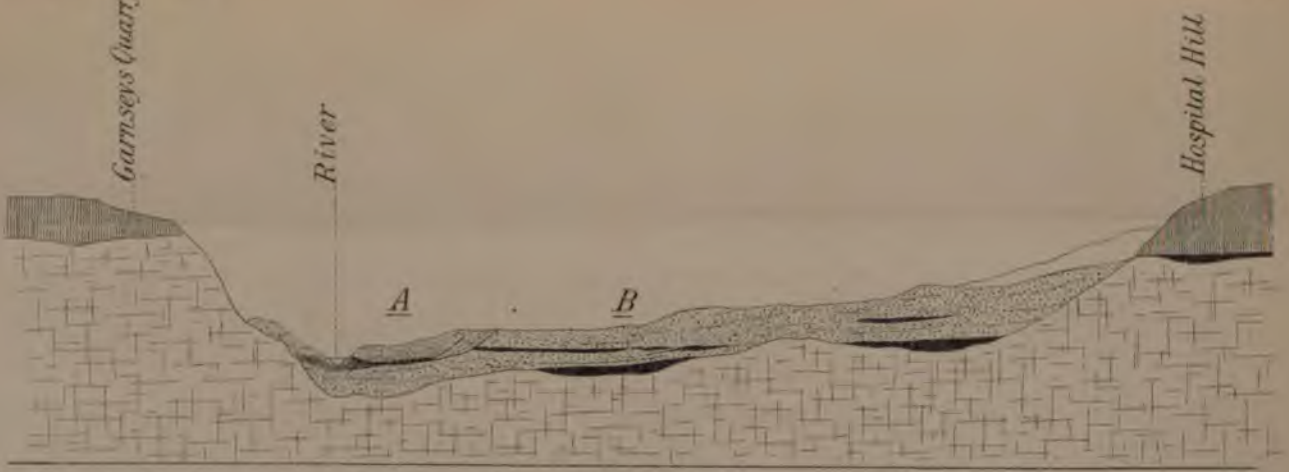
A.G.H. del.

S. Sedgfield lith.



Sketch Section of the valley of the Macquarie at Dubbo (one mile)

■ Water bearing Drift.

▤ Basalt.

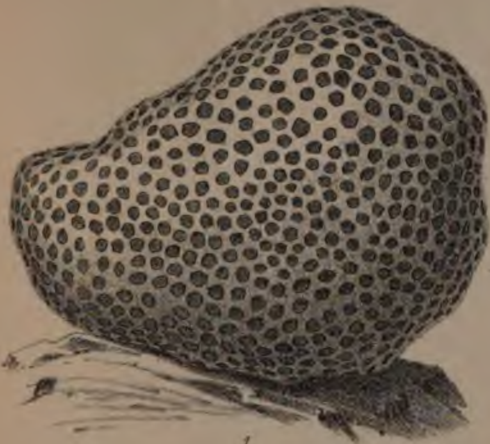
▨ Impervious Clays.

▦ Sandstone.

Wells at A rise with the river: Wells at B not affected by changes in river level.

J. Milne Curran del.

S. Sedgfield, lith.



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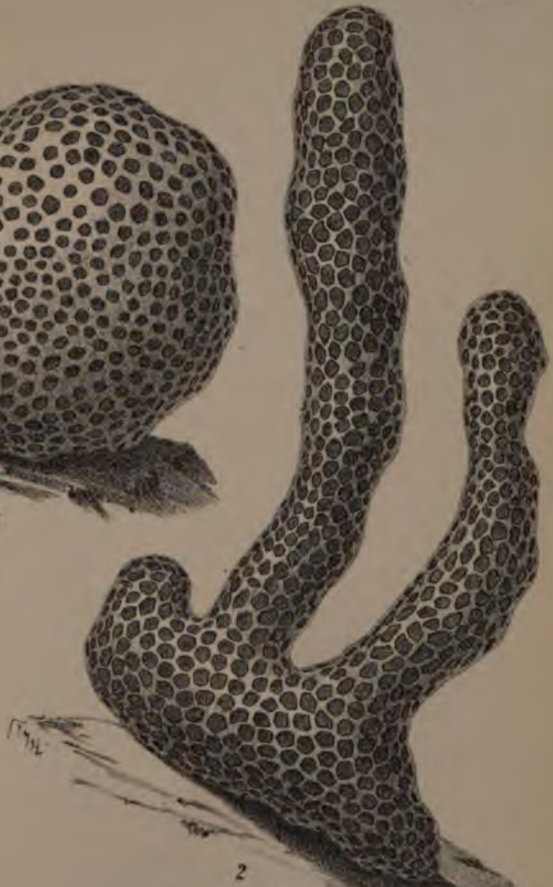

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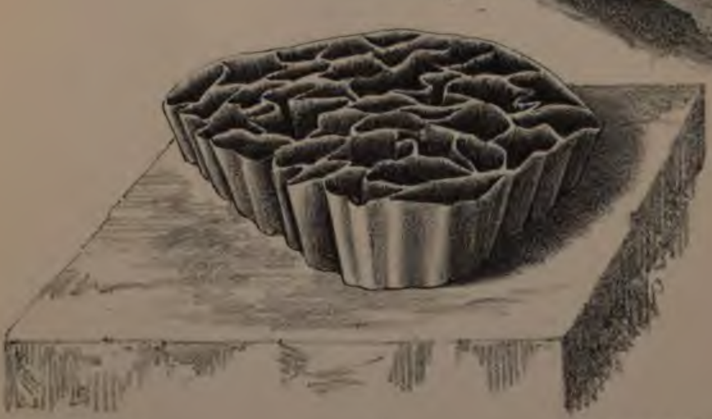

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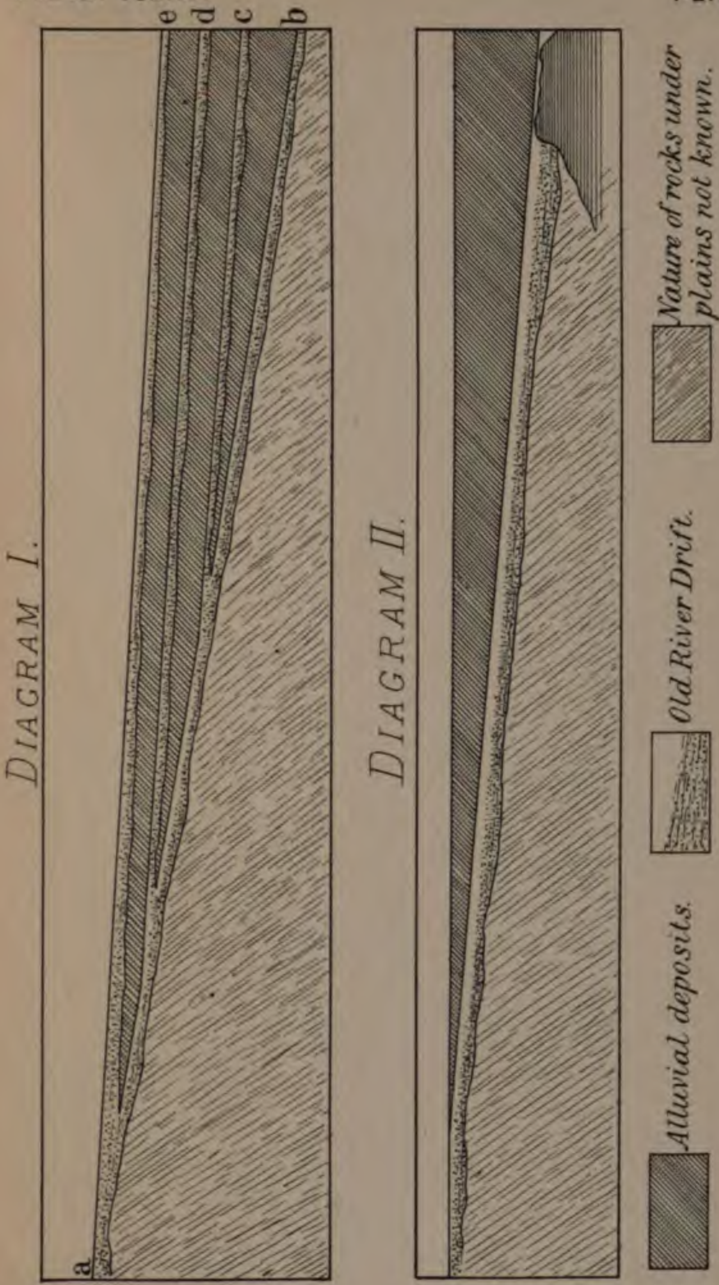
v. Lendenfeld del. S. Sedgfield lith.



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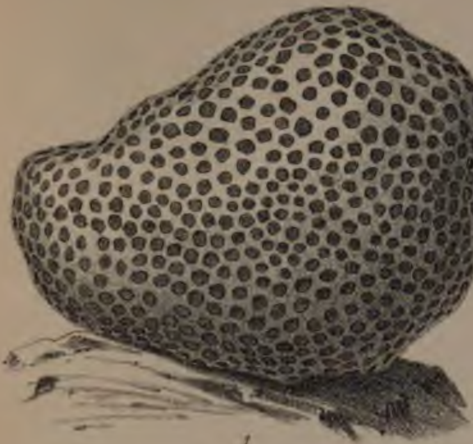

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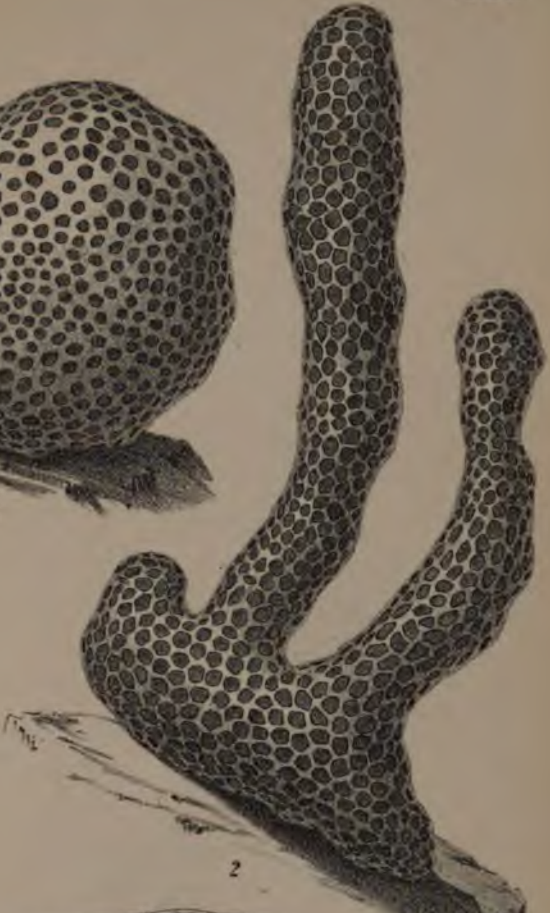

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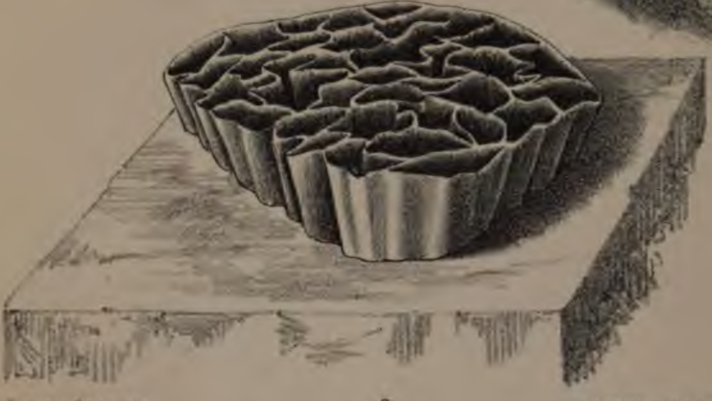

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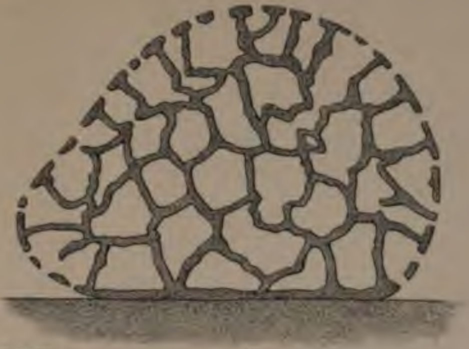

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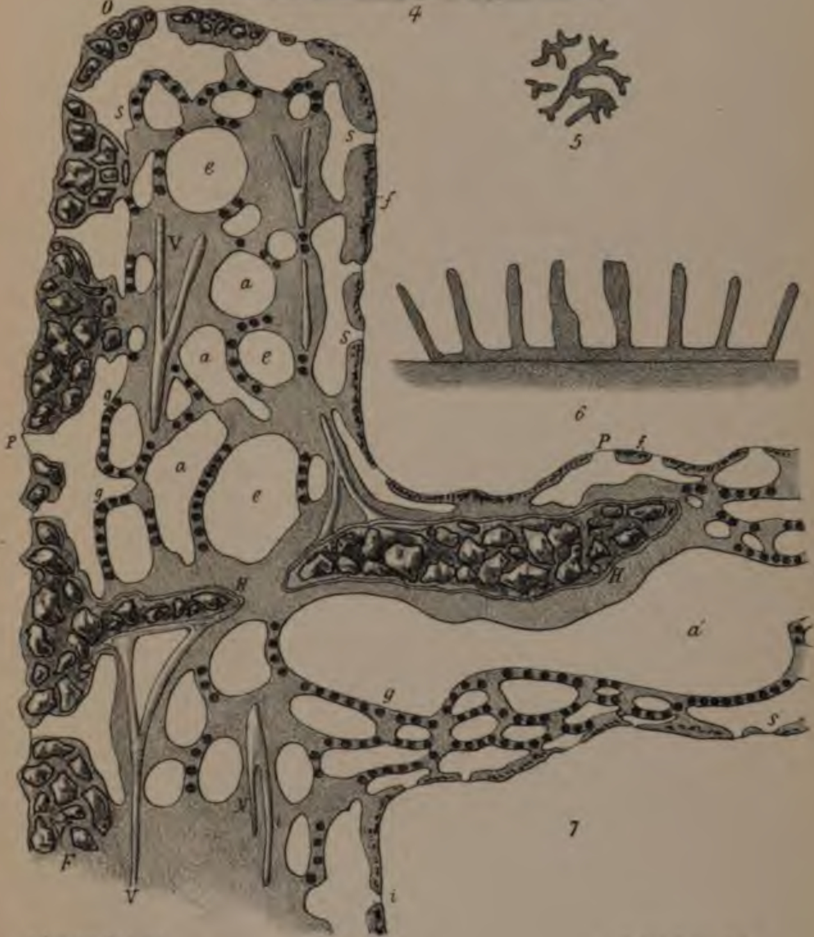

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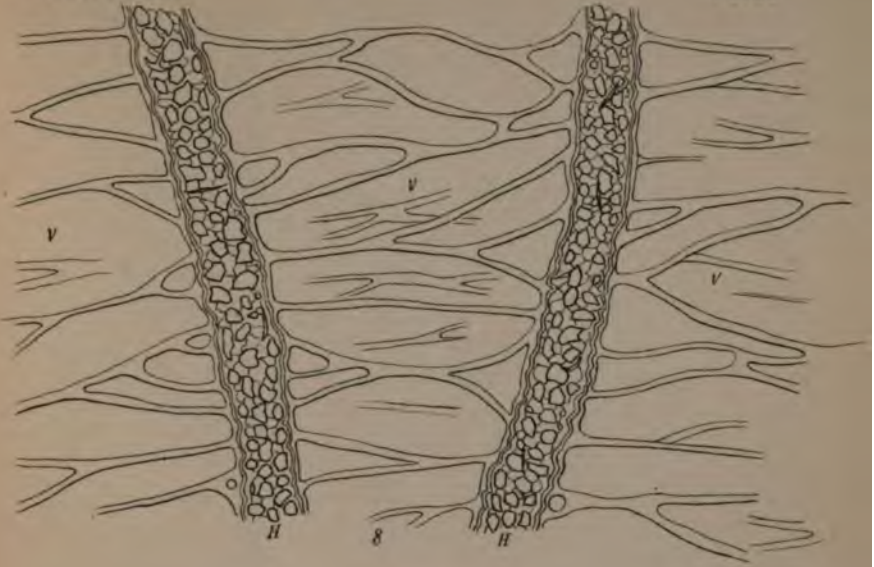

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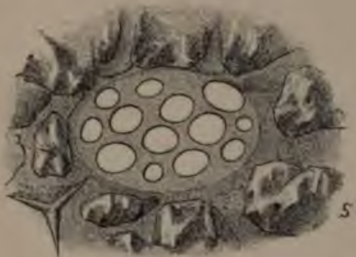

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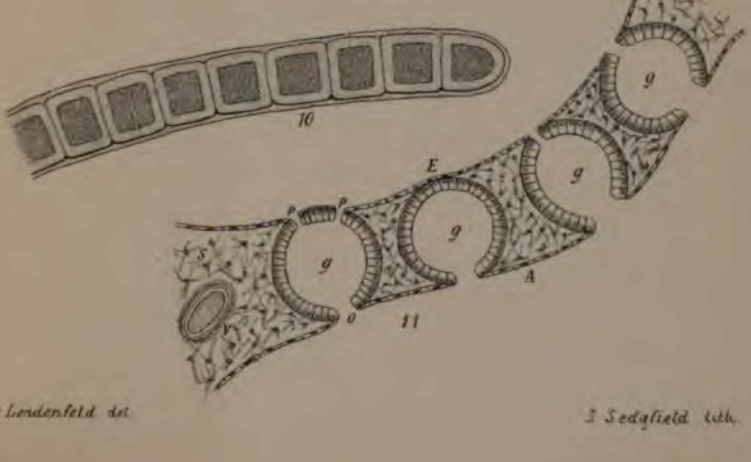

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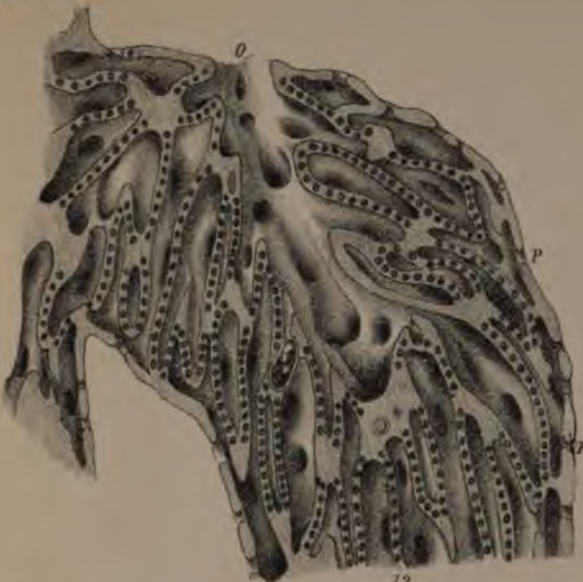
v Lendenfeld del. J. Sedgfield lith.



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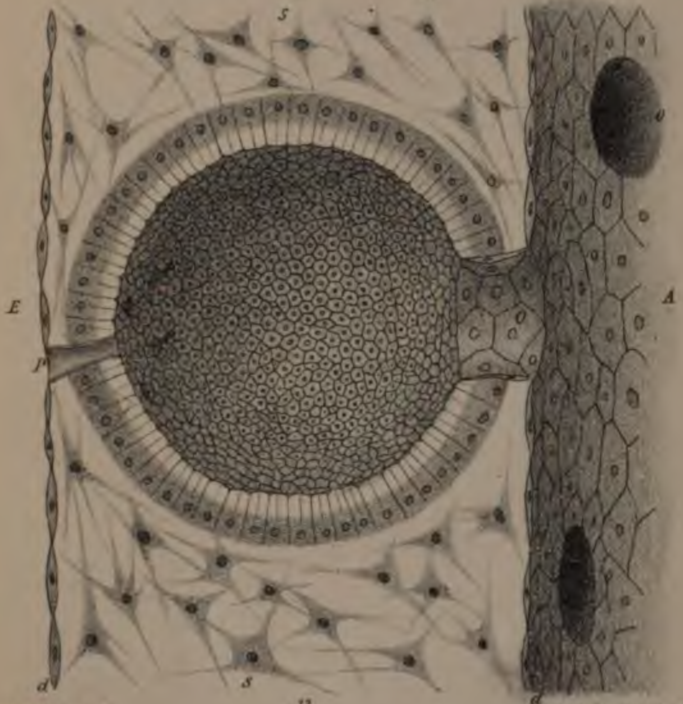

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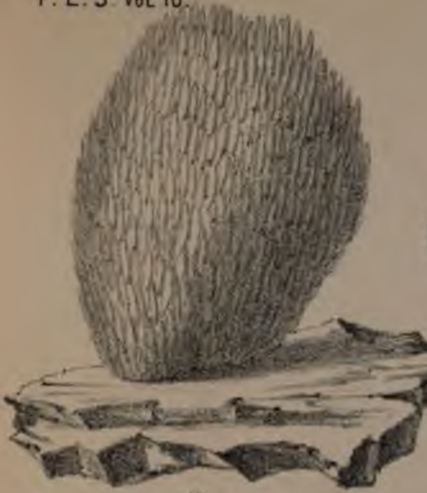

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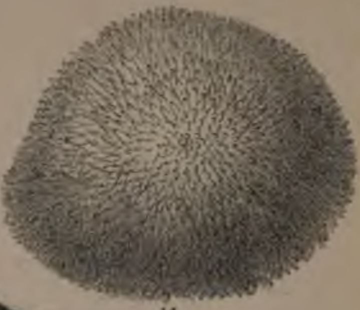

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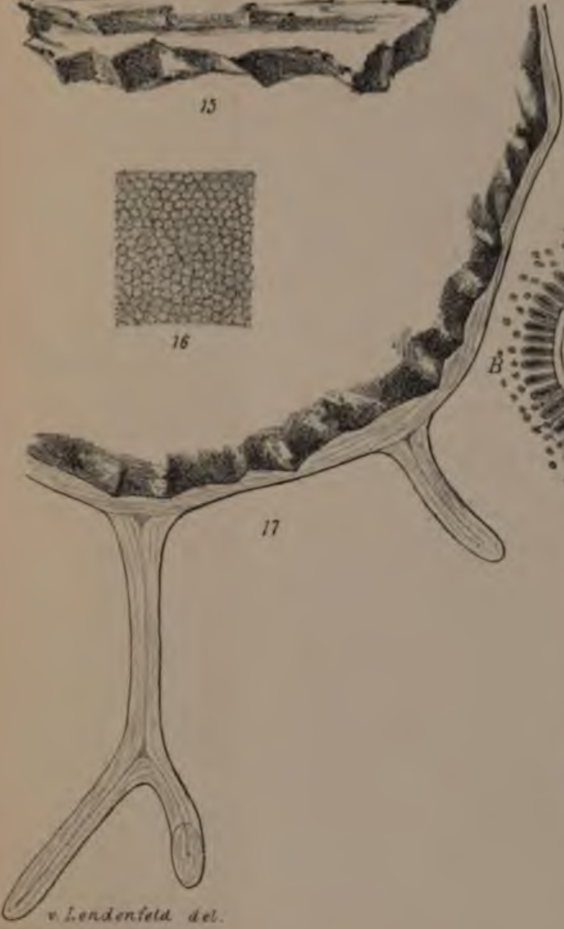

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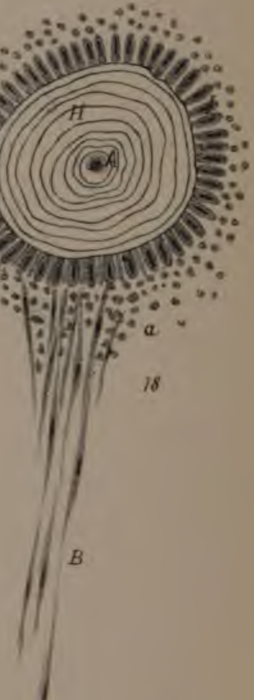

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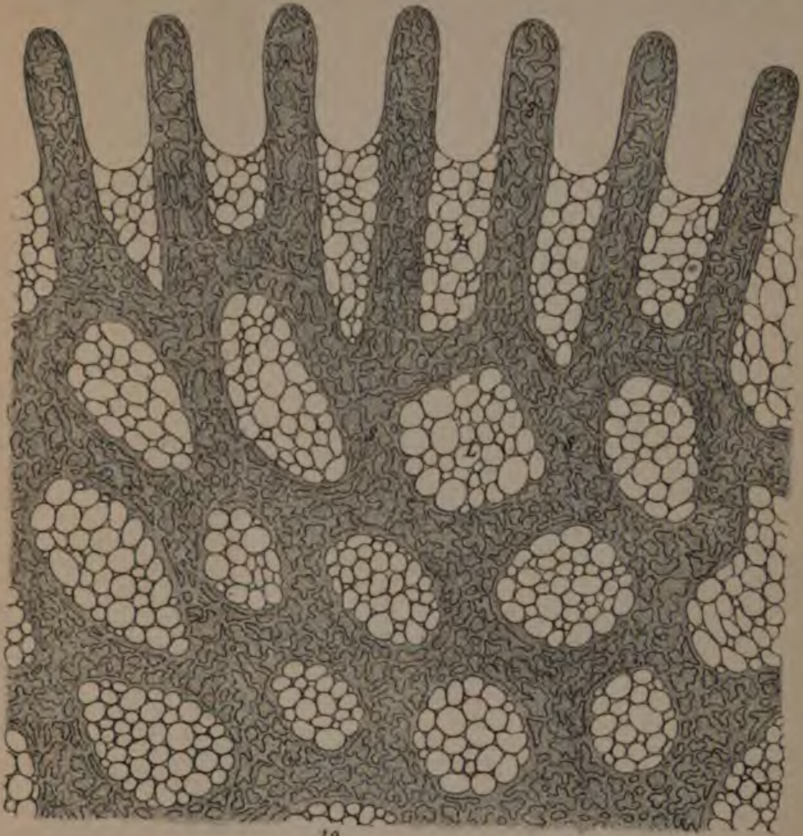
S. Sedgfield lith.



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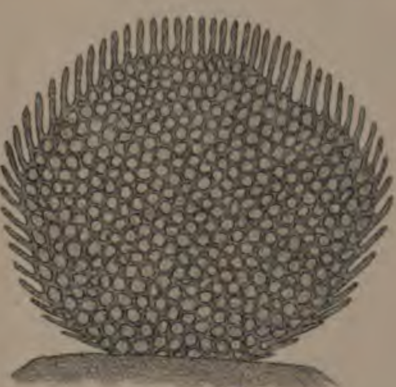

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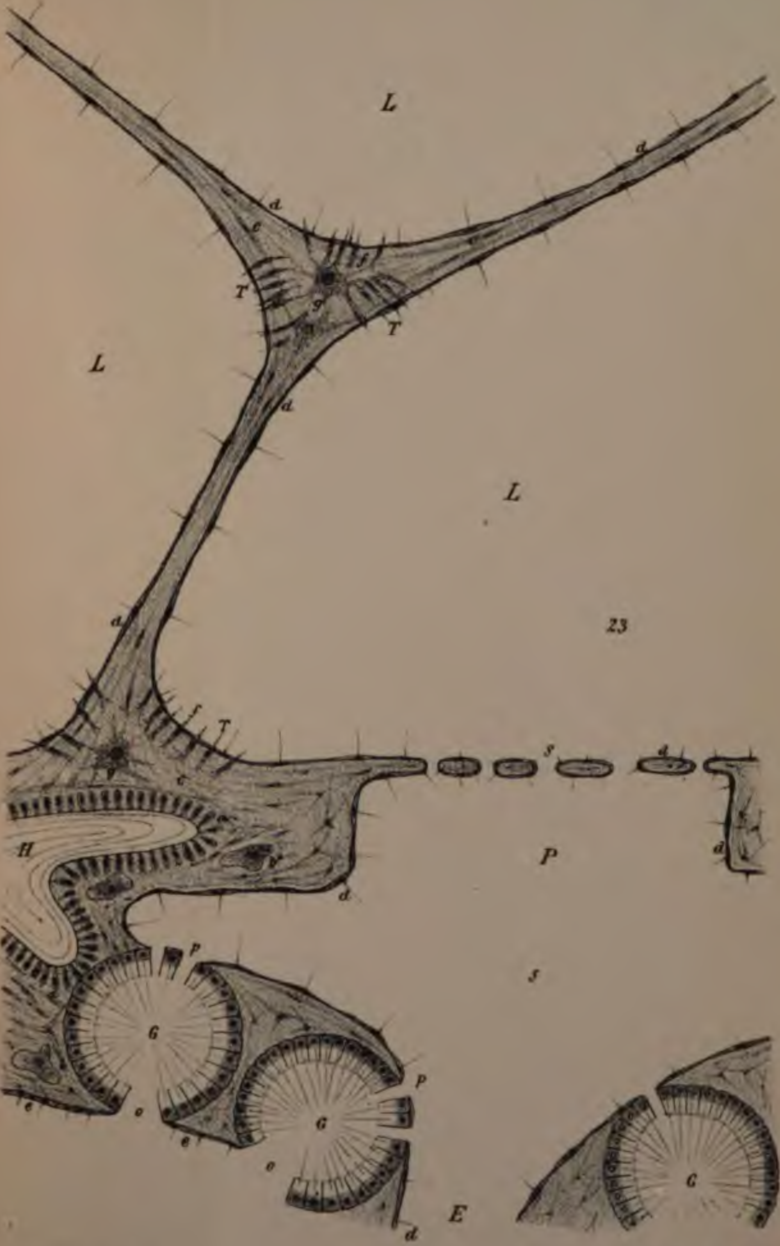

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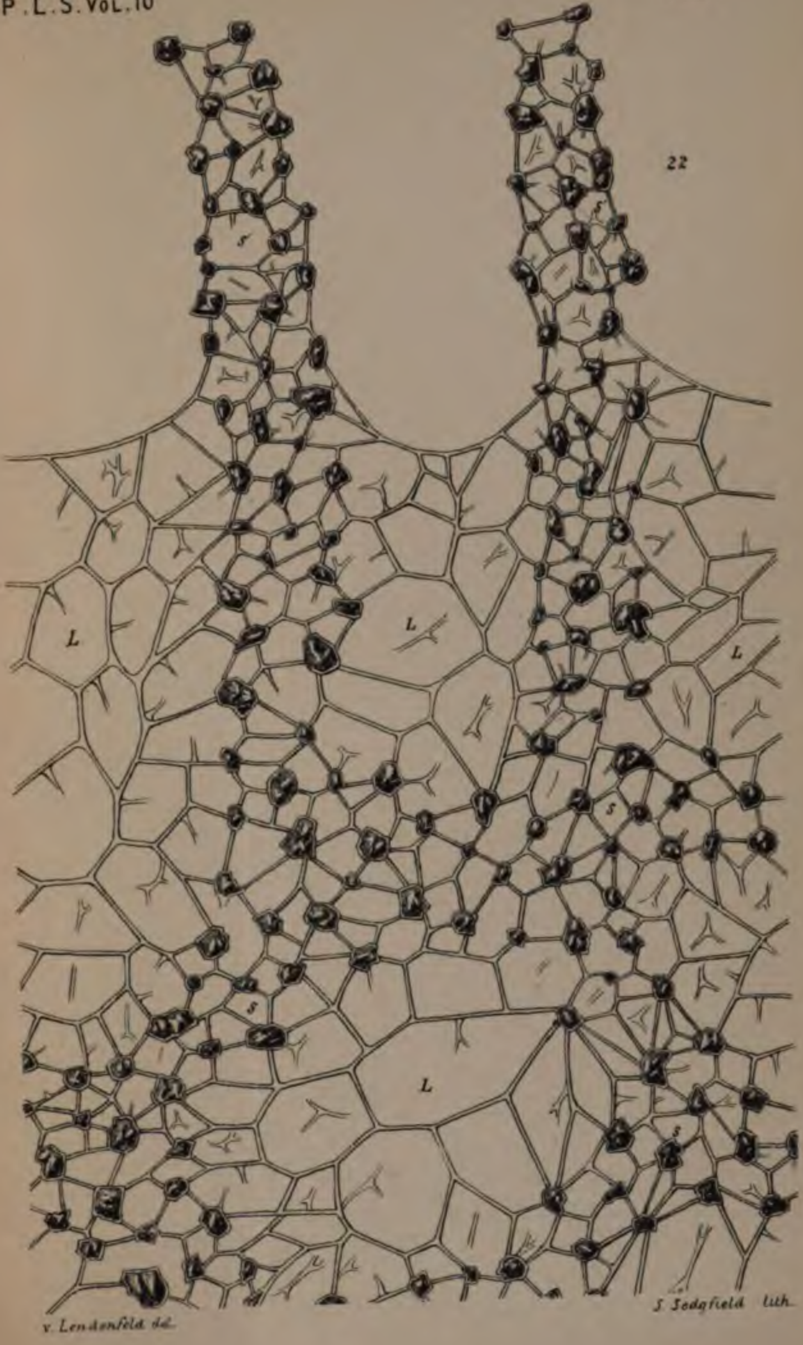
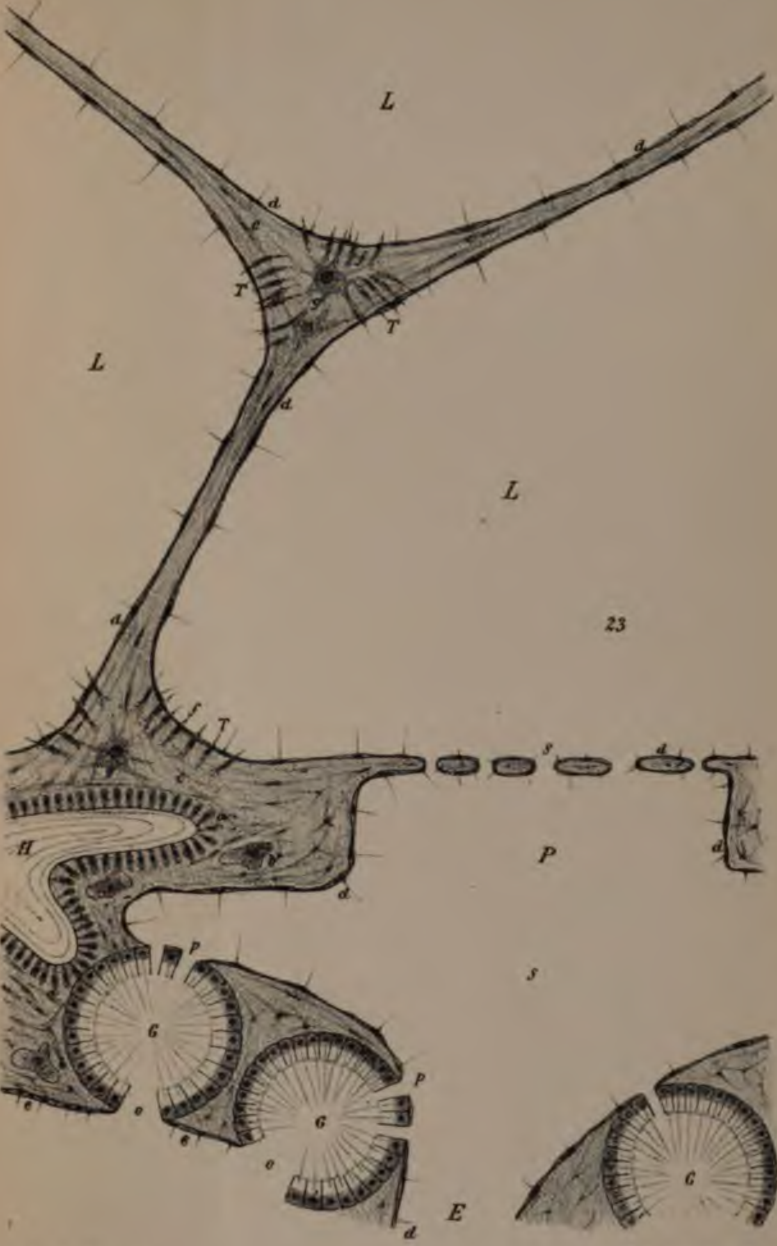


v. Lendenfeld del.

S. Sedgfield lith.

Pl. 34



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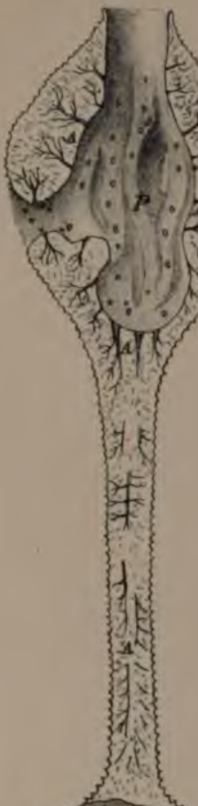

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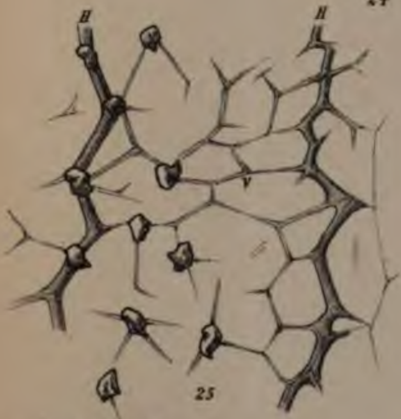

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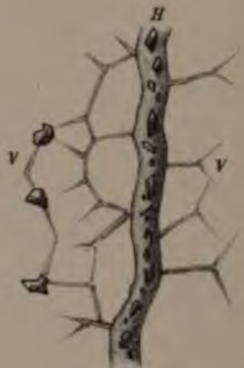

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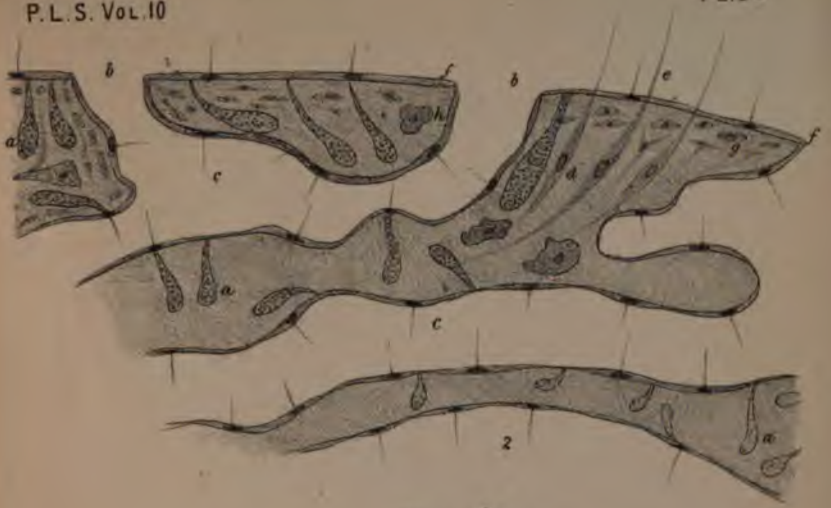

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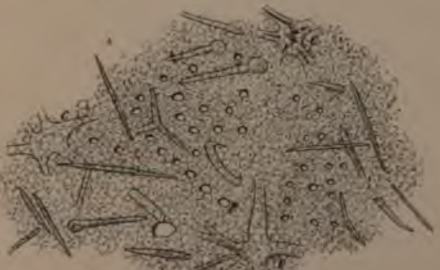

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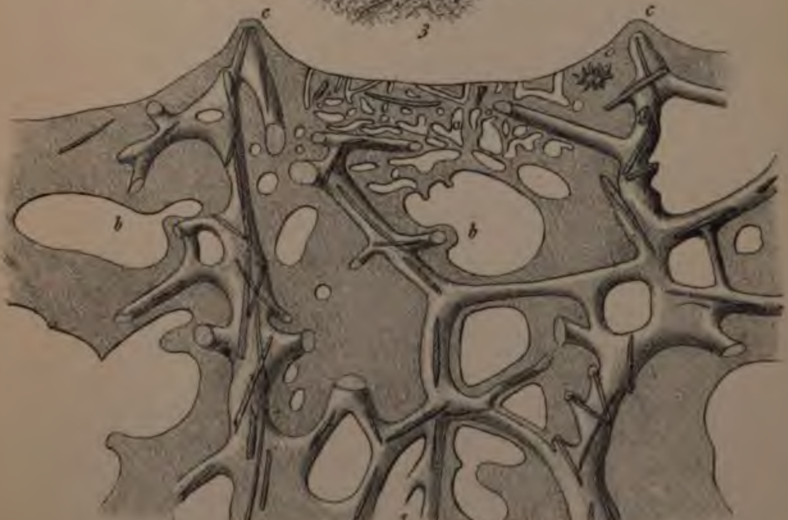

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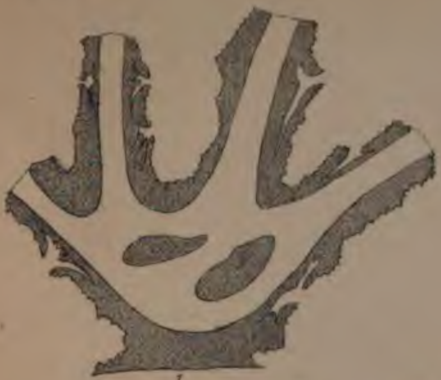
v. Lendenfeld del.

S. Sedgfield lith.



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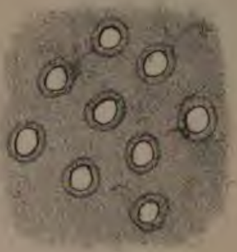

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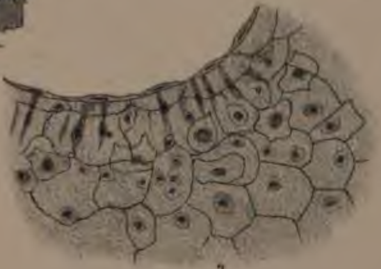

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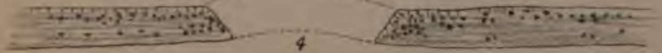

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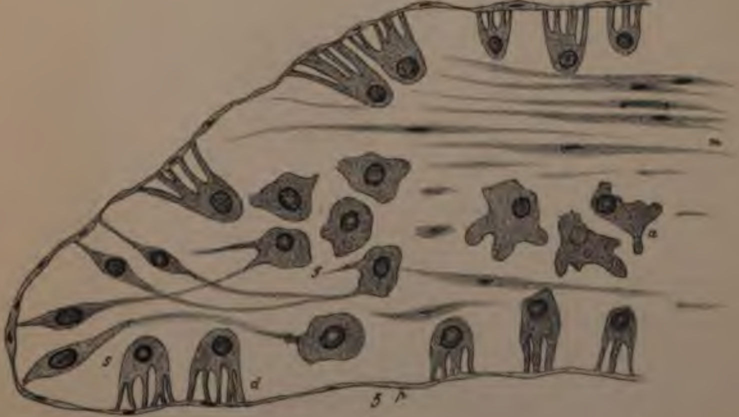

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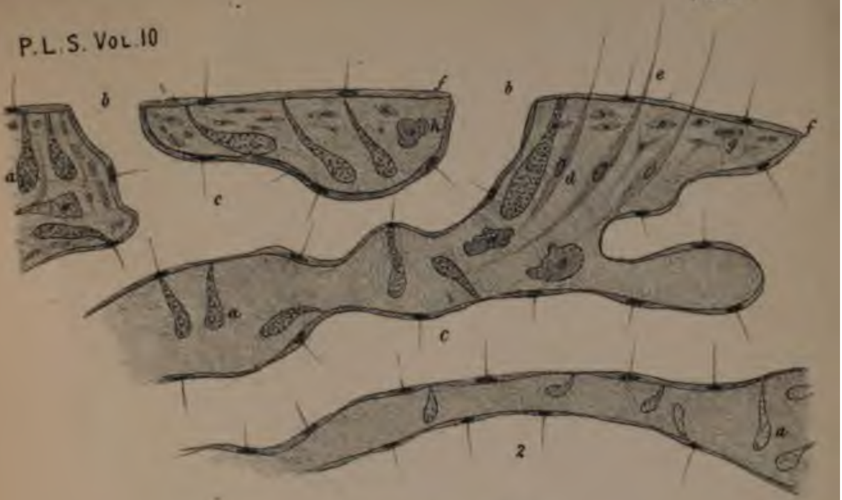
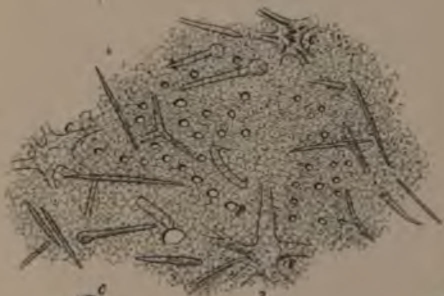
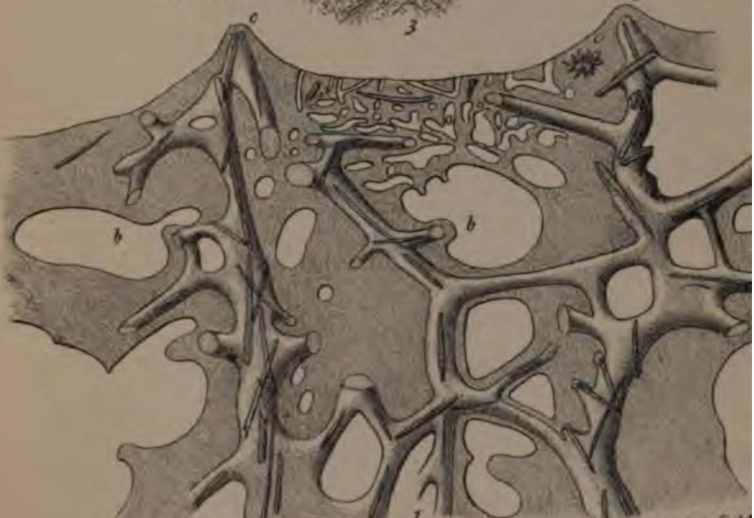
S. Sedgfield lith.

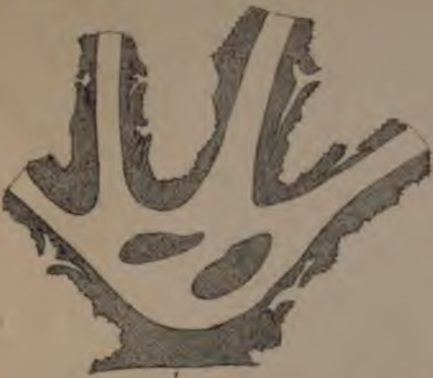






S Sedgfield

v. Lendenfeld del.



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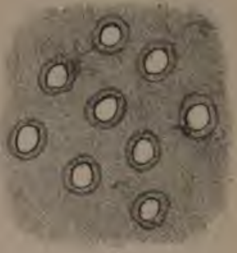

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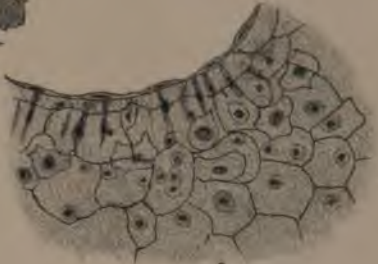

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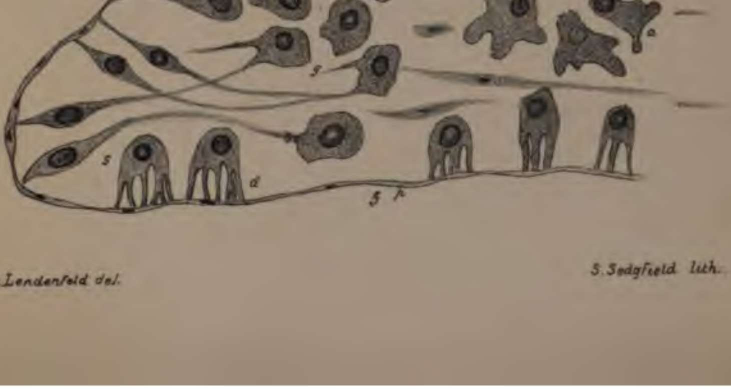

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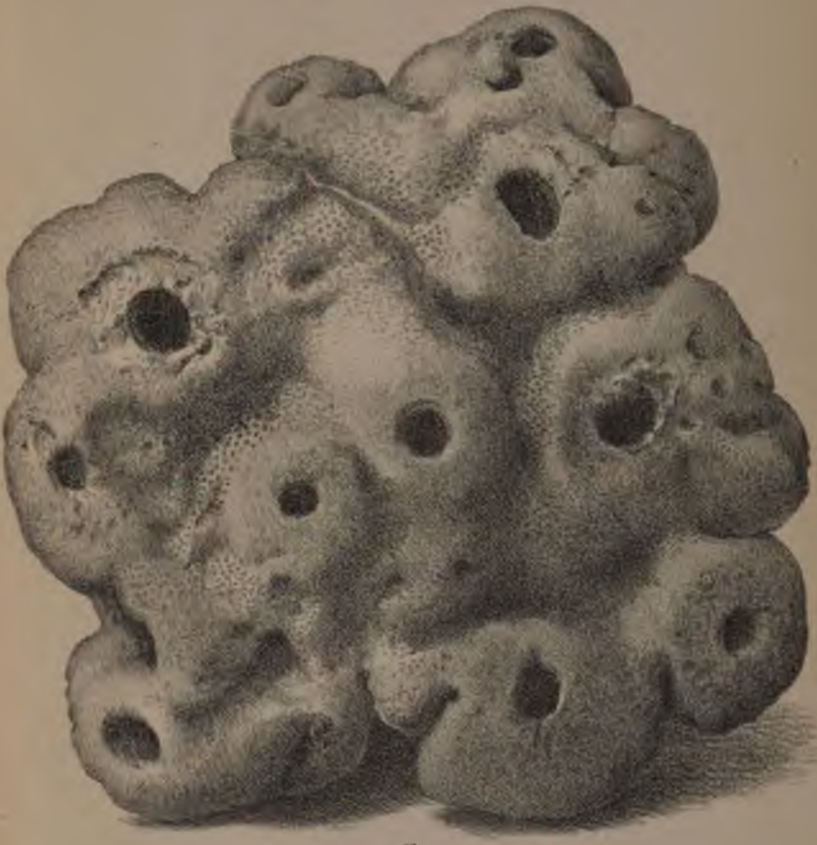

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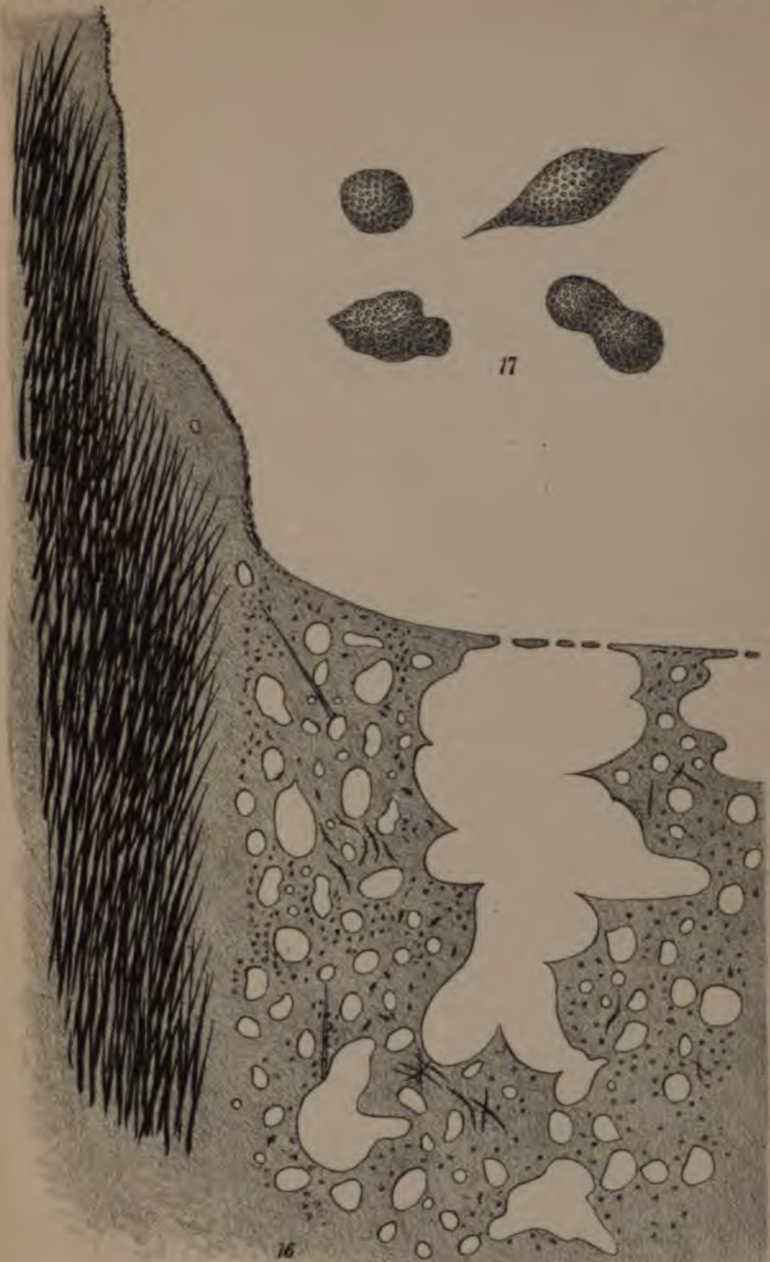

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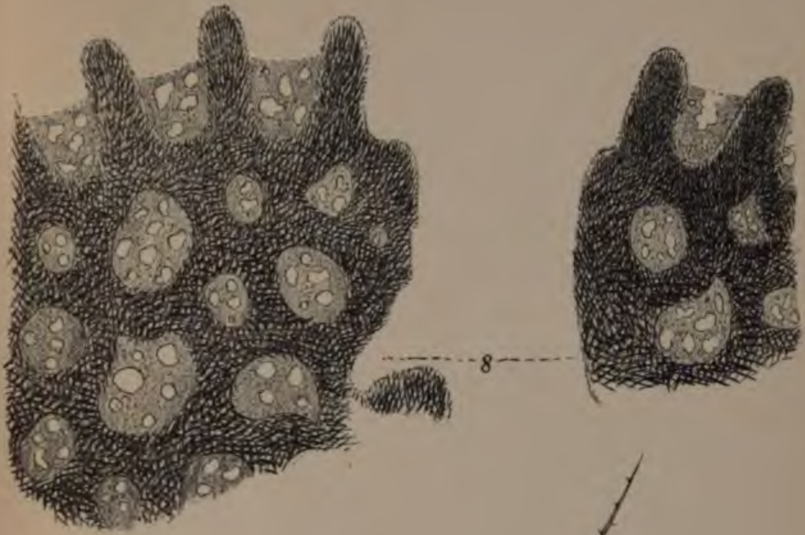
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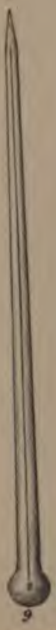
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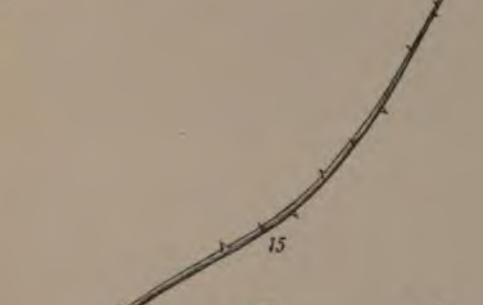
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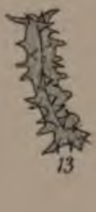
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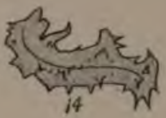
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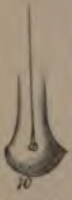
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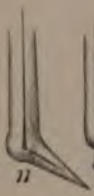
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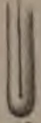
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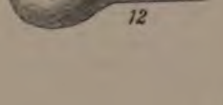
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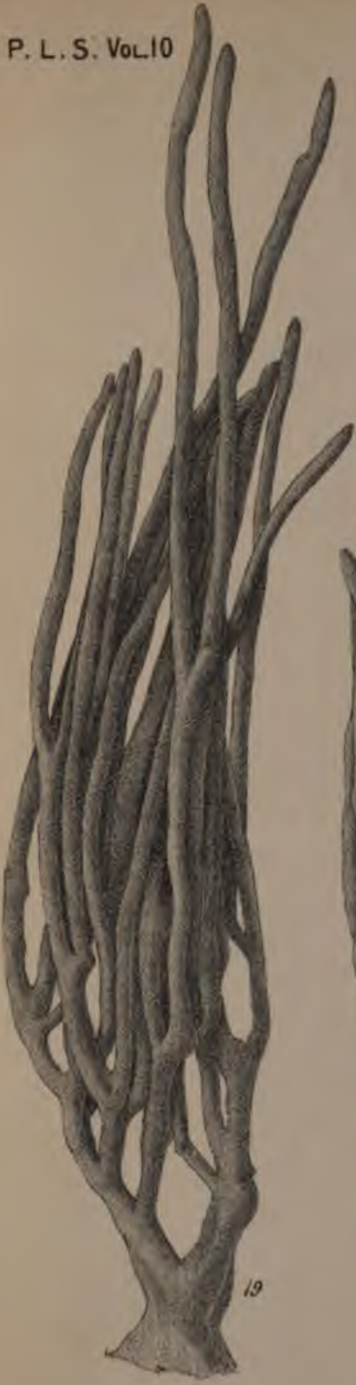
v. Lendenfeld del.

S. Sedgfield lith.



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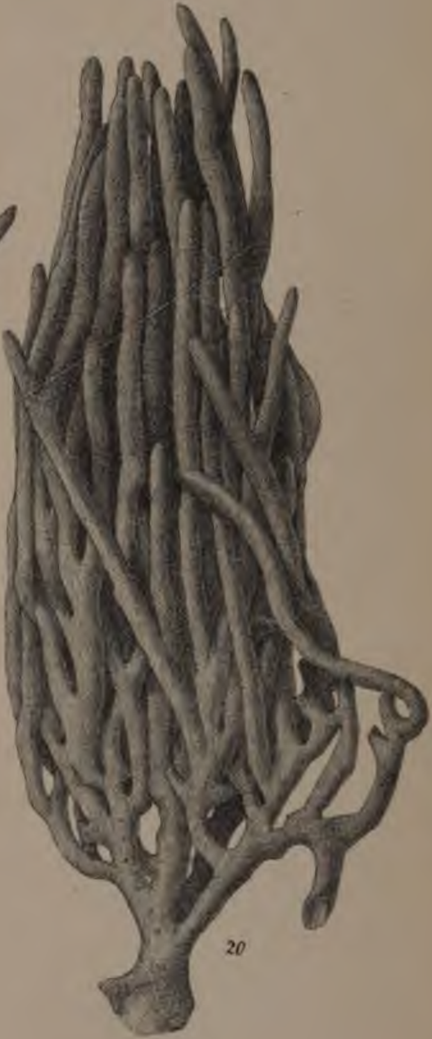

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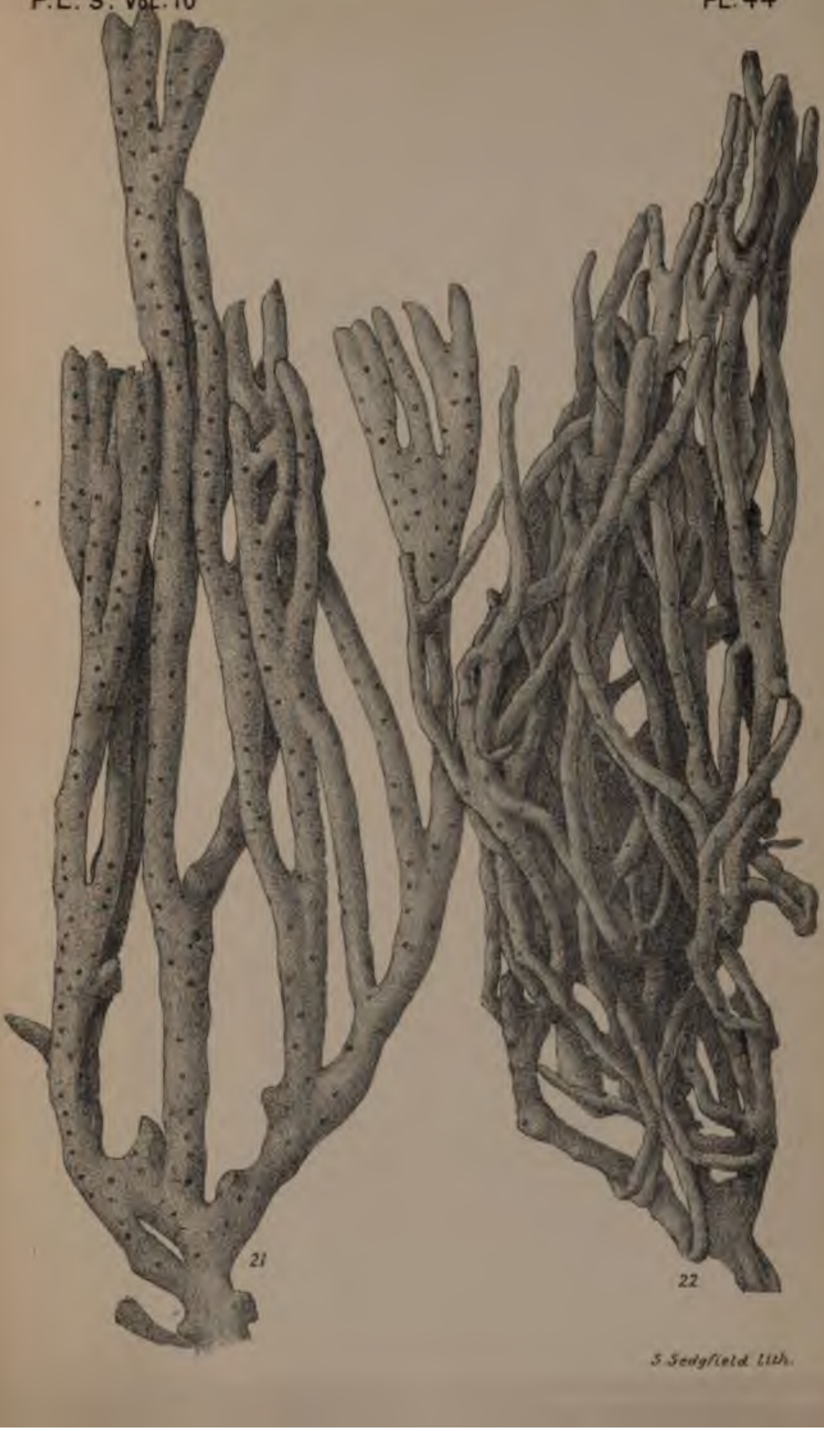

S. Sedgfield lith.

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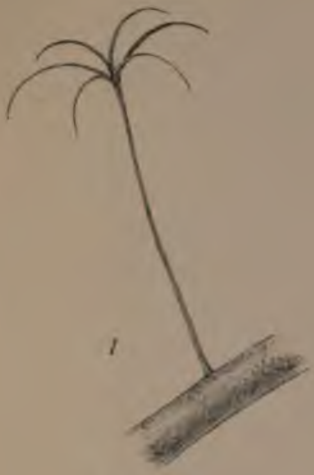
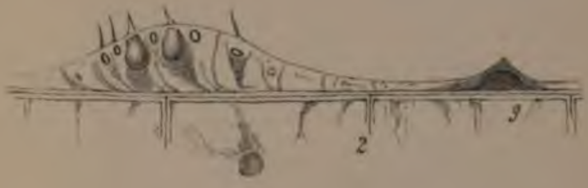
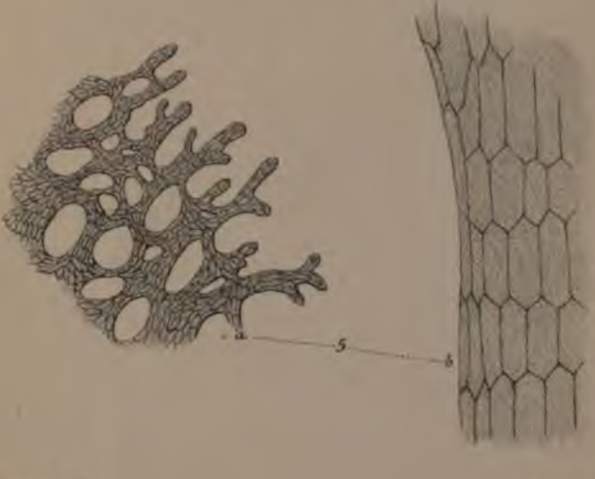
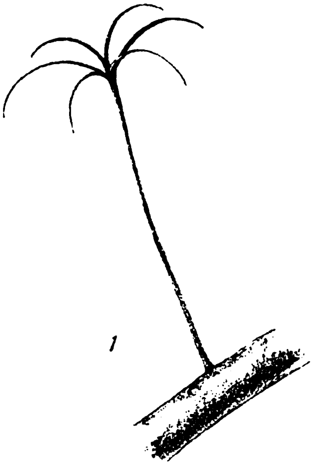


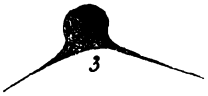


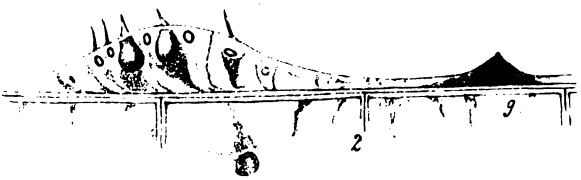


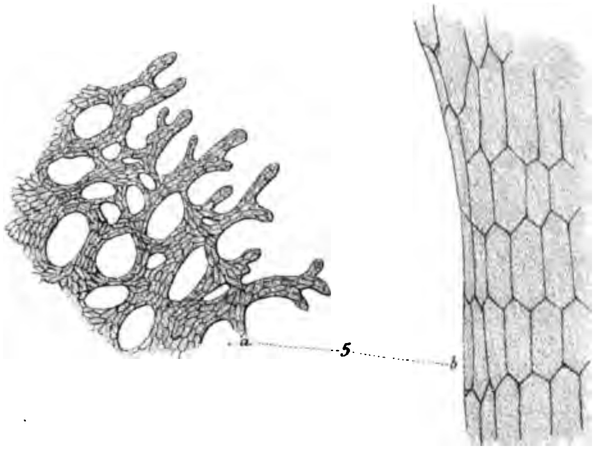
v. Lendenfeld del.

S. Sedgfield lith.





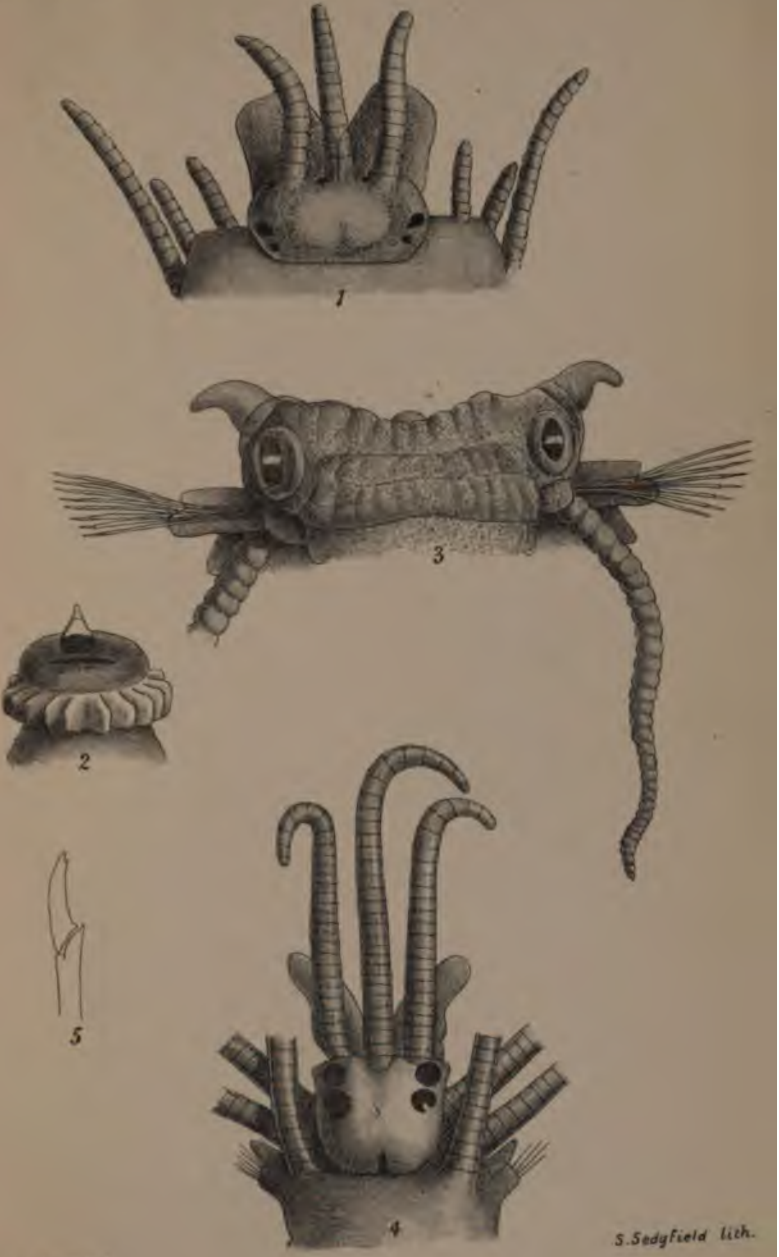




v. Lendenfeld del.

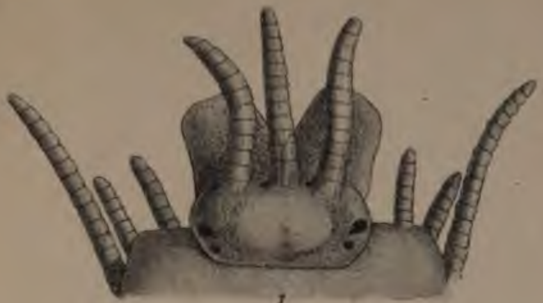
S. Sedgfield lith.

PL. 50



W. A. H. del.

S. Sedgfield lith.



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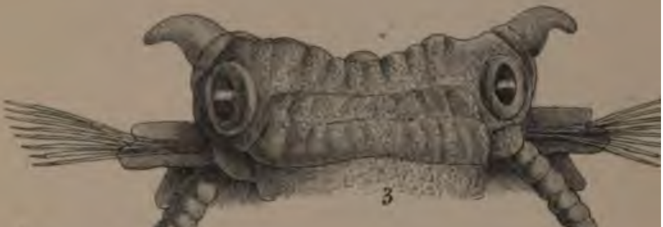

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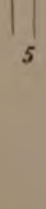

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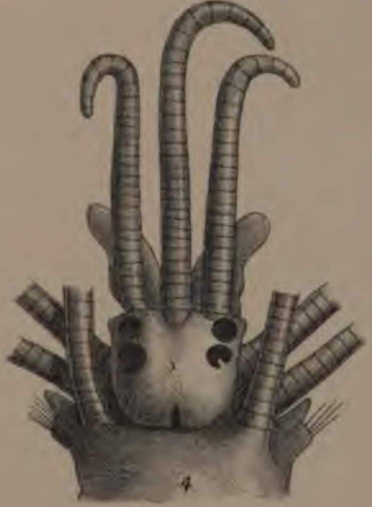

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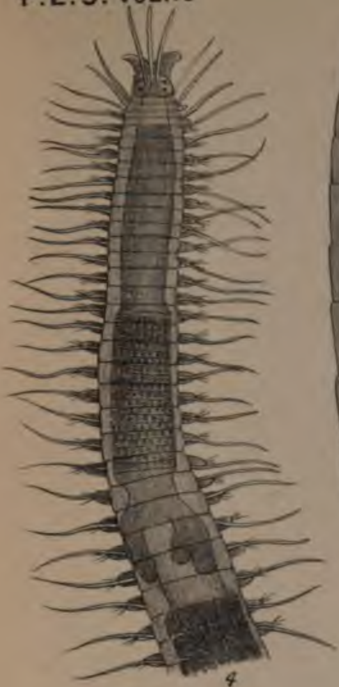

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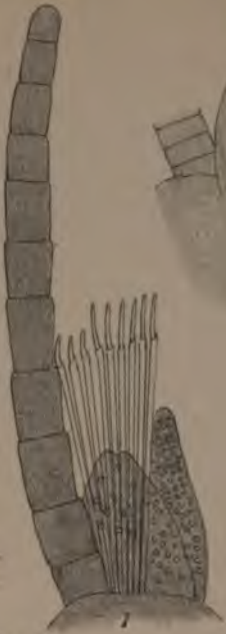

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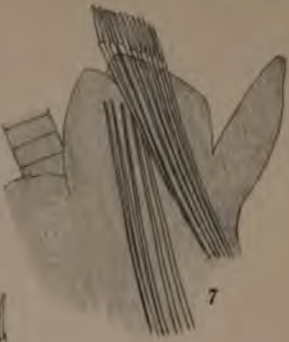

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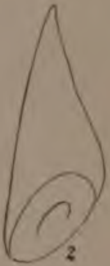

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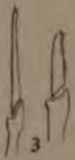

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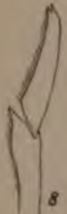

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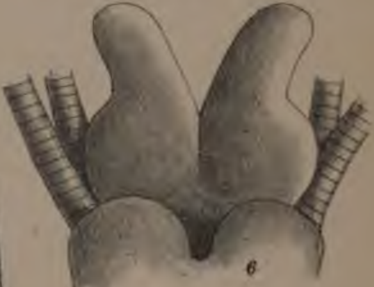

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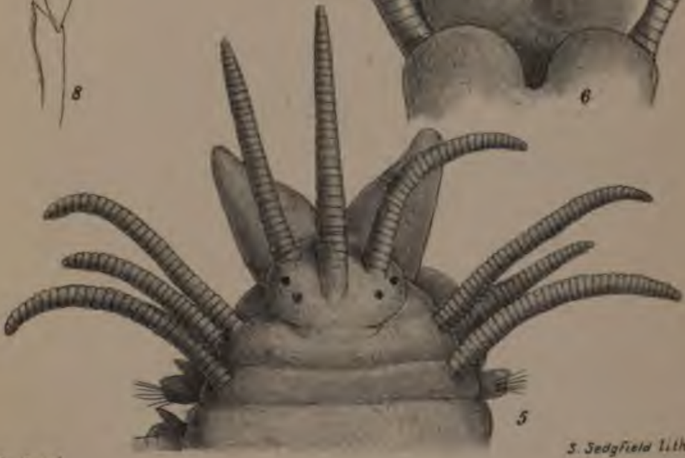

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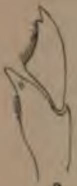

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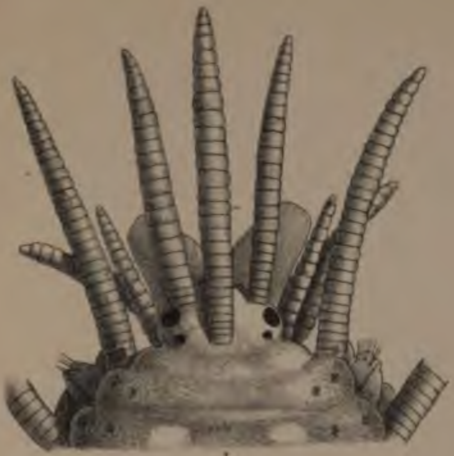

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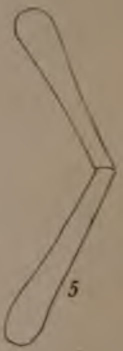

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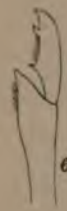

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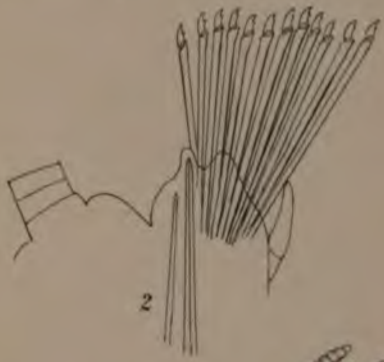

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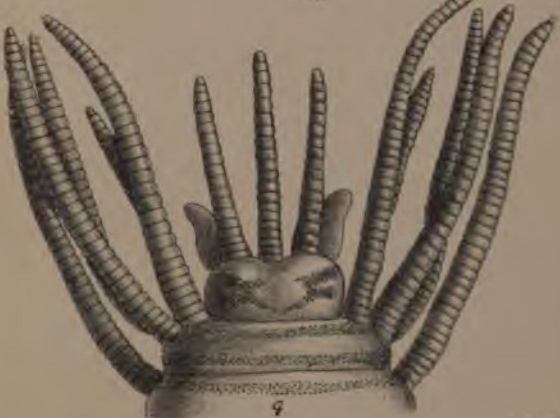

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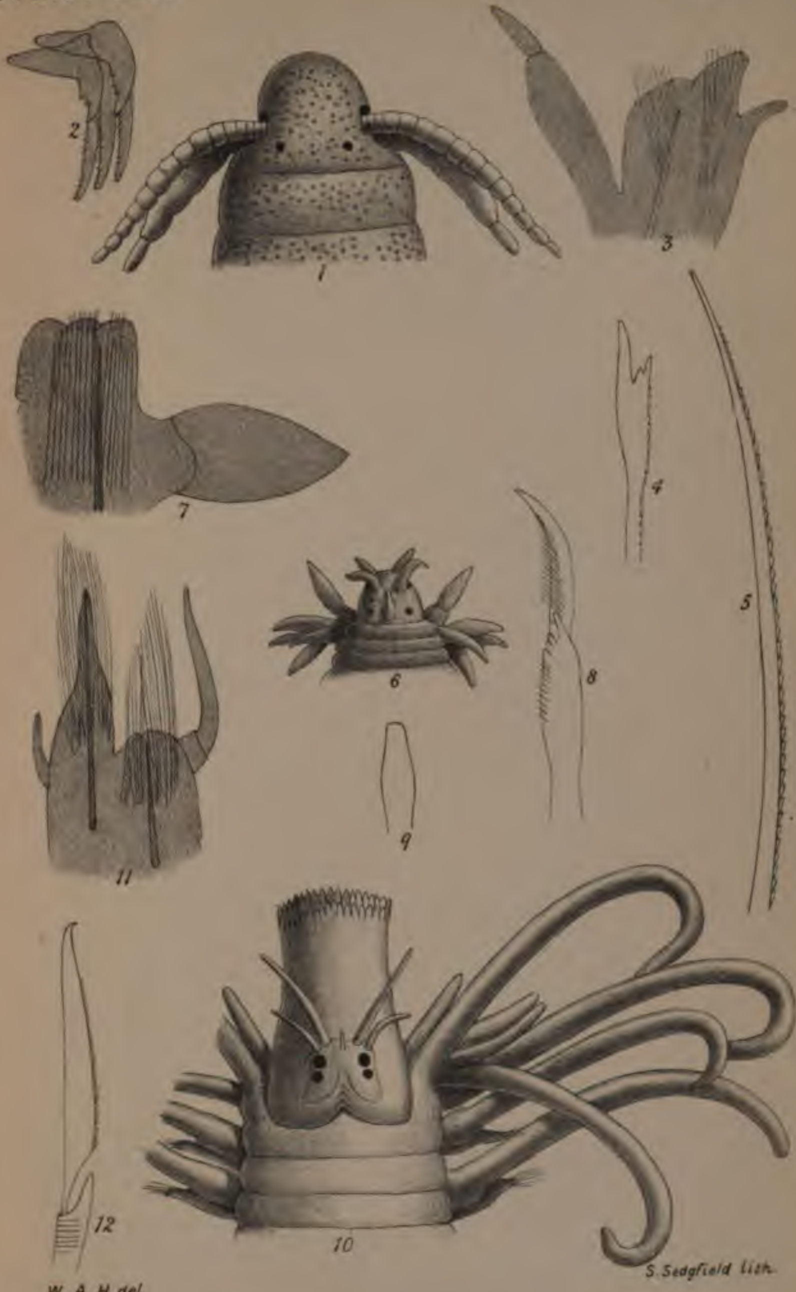

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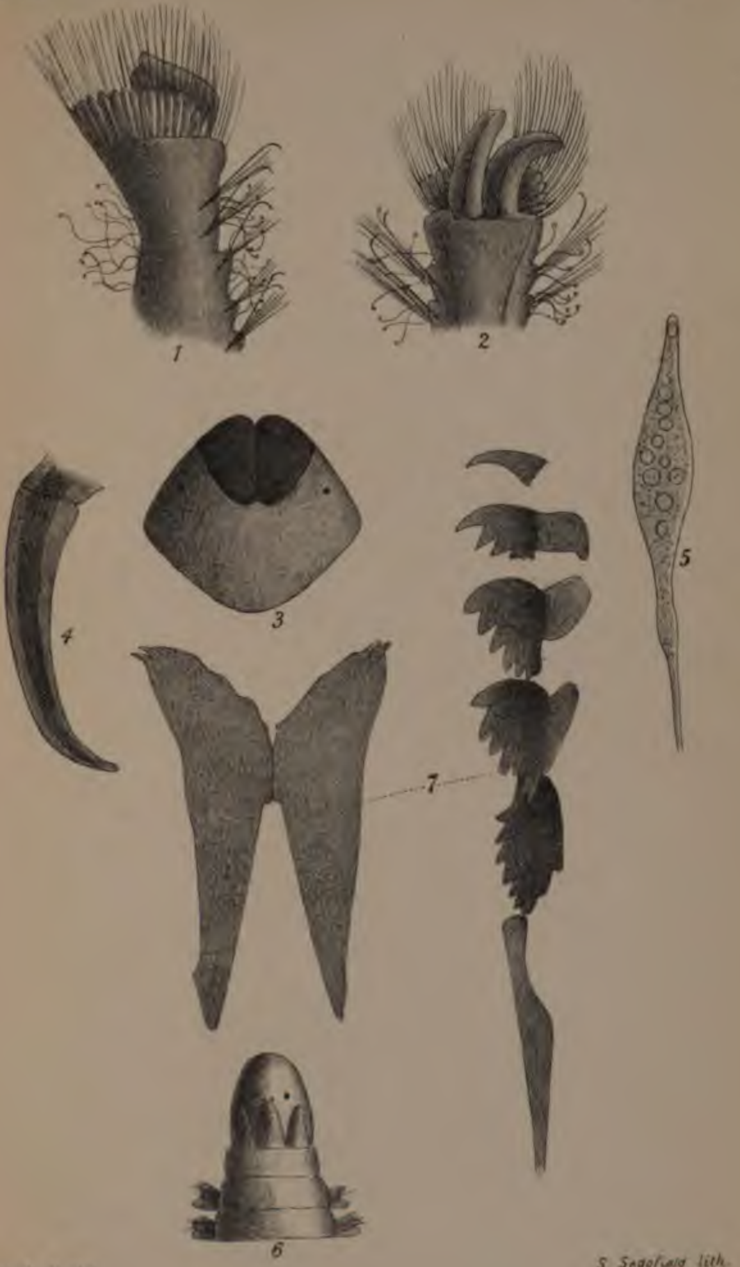

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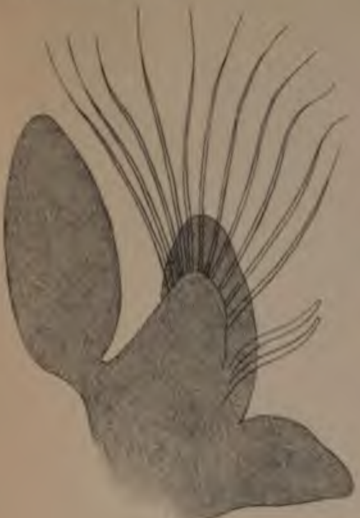

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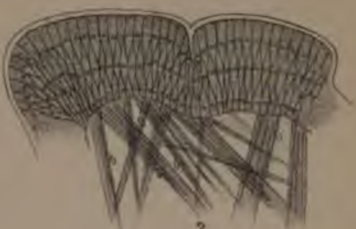

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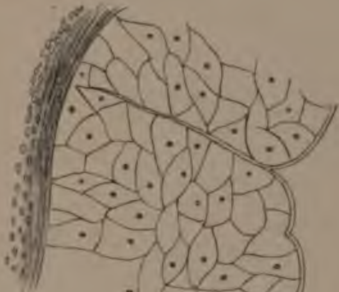

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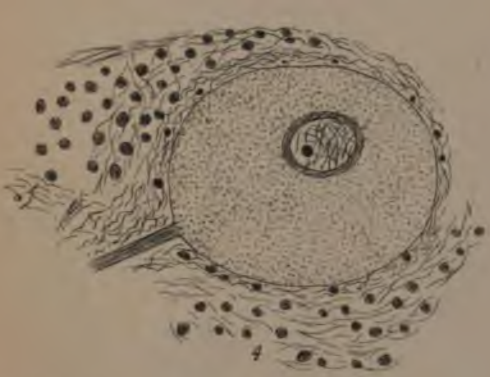

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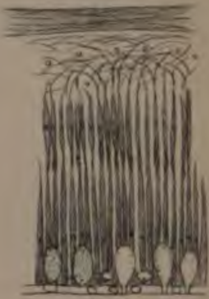

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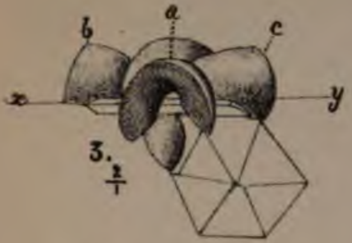

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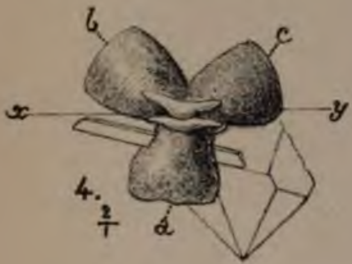

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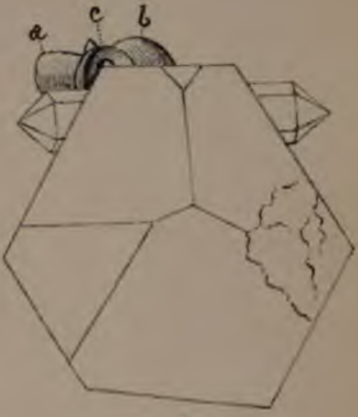

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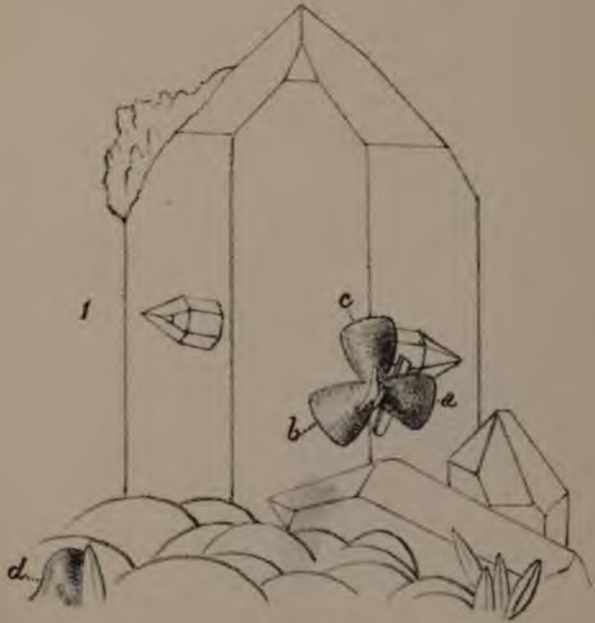

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